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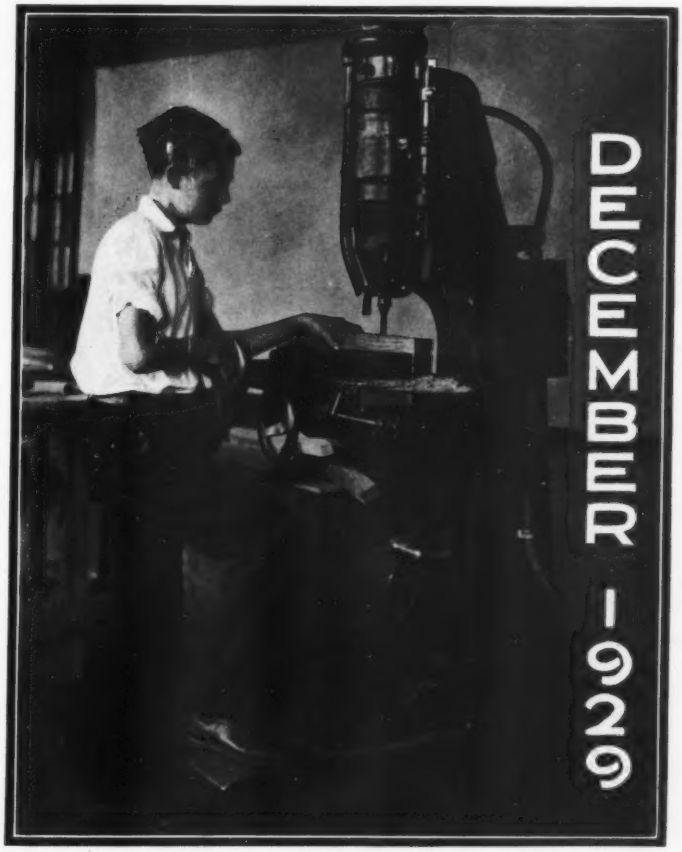

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NEW YORK MILWAUKEE CHICAGO

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VOLUME XVIII
No. 12

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TABLE OF CONTENTS

Historic Background of Modern Vocational Education in the United States 447
Arthur B. Mays
The Collection and Use of Occupational Material in a Vocational-Guidance Program 450
Harry S. Belman
Aviation in Secondary Schools 454
Andrew Roswall
Graphic Arts in the Gary Schools 456
William O. Wallace
EDITORIALS: Aeronautics in High School — Appreciation of Tools — Proper Habits — Real Modesty 458
What of the Summer? 459
Henry H. Batchelder
Printing Christmas Cards in the School Shop 460
R. Randolph Karch
The Value of a Notebook in Printing 463
Leroy Brewington
New Orleans' Contribution to Vocational Education 464
Robert Brydon

SUPPLEMENTS

Leveling Jacks ..... No. 159
C. H. Niemann
Smoking Stand ..... No. 160
Clifford B. Smith

POSTERS

Wrestling in the Shop 471
Earl L. Bedell and *George Peacock*
Honesty 472

PROBLEMS AND PROJECTS

Doll Cart or Dump Cart 467
C. Anthony Van Kammen
A Fernery 469
Gerald A. Boate
Interpreting Working Drawings 469
Kenneth B. Marsh
Contract for Molding 473
E. W. Manzer
Coffee Table 473
Jos. J. Lukowitz
Stencil Designs 475
D. Elizabeth Roberts
Cookie Pan 475
Edward Stein
A Miniature Lighthouse 476
Charles Rice
Typical Job Sheet for the Auto Shop 476
Ray F. Kuns
Book Ends 477
Geo. E. Myers
A Junior-High-School Motor 477
Charles Rice and *E. T. Williams*
Reclaiming Used Motor Oils 479
L. M. Jordan
Method of Transferring Designs on Wood 479
Geo. A. Phillips
A Home Problem 480
Howard W. Boekeloo

Association and Convention Activities 480
Now, Are There Any Questions? 30a
Among the Industrial-Arts Teachers 33a
New Publications 37a
School Shop Equipment News 42a
News and Notes 46a

THE INDEX

For those who bind their INDUSTRIAL-ARTS MAGAZINES, the annual title-page and index is included in the present issue.

ARE YOU READY?

The A.V.A. convention will be held on December 5, 6, and 7 at New Orleans. Read about this important meeting, and about the convention city on pages 464, 481, and 482 of this issue.

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(The articles contained in the Magazine are regularly indexed in "The Reader's Guide to Periodical Literature," "Education Index," and "Current Magazine Contents."

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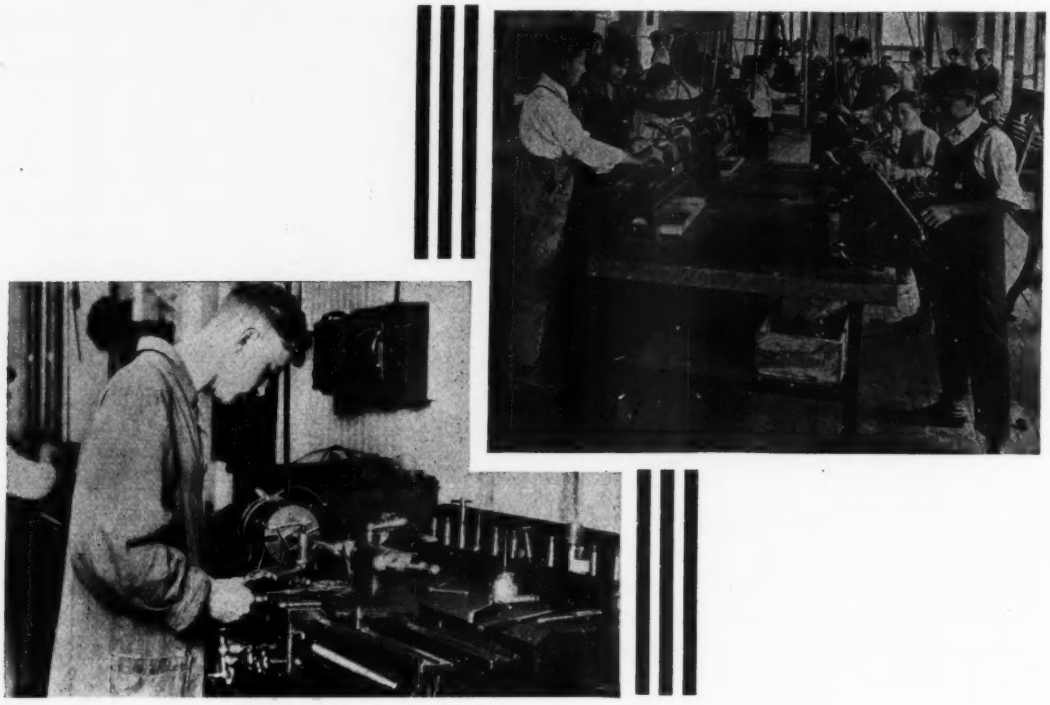

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THE INDUSTRIAL-ARTS MAGAZINE

Volume XVIII DECEMBER, 1929 Number 12

Historic Background of Modern Vocational Education in the United States

Arthur B. Mays, Professor of Industrial Education, University of Illinois

PART II

State Schools

The state universities, which were from the first much more utilitarian in their point of view than the earlier colleges, rapidly developed professional education and early expanded their offerings to include vocations other than the learned professions. The point of view of the state universities is well expressed by Andrew Sloan Draper, who was president of the University of Illinois from 1894 to 1904. He said: "Obviously, the American university, as no other university in the world, must regard the life and especially the employment of the people. It must exhibit catholicity of spirit; it must tolerate all creeds; it must inspire all schools; it must guard all the professions, and it must strive to aid all the industries. It must quicken civic feeling in a system where all depends upon the rule of the people. It must stand for work, for work of hand as well as of head, where all toil is alike honorable and all worth is based upon respect for it."[15] And, in the same connection, he further wrote: "The American university will carry the benefits of scientific research to the doors of the multitude. It will make more sanitary houses and handsomer streets, richer farms and safer railways, happier towns and thriftier cities, through the application of fundamental principles to all the activities of all the people."[16] It is not surprising, then, to find these tax-supported institutions leading the way to a remarkable extension of opportunity for vocational education in the pursuits requiring preparation of college grade. With the final passage of the Morrill Act in 1862, which provided for the establishment of the "Land-Grant Colleges," training in the higher phases of the agricultural and mechanical occupations became an established function of American public education. It should be noted, however, that Michigan established an agricultural college as early as 1857, and Yale created a professorship in agriculture ten years earlier than that.

Polytechnic Institutes

Paralleling the development of new vocational departments in the universities, and the growth of agricultural and mechanical colleges, there grew up another interesting type of institution known as the Polytechnic Institute. This school was designed to capitalize the rapidly expanding knowledge of and interest in the physical science which characterized the early years of the nineteenth century. Its purpose was to teach American youth how to make practical applications of the physical sciences to the economic life of the country. Gradually these schools became primarily engineering colleges, though they have retained their earlier names. The first, and one of the most famous such schools is Rensselaer Polytechnic Institute at Troy, New York, which was opened in 1825. Other noted schools of this type are: Worcester Polytechnic Institute at Worcester, Massachusetts, established in 1868; Case School of Applied Science at Cleveland, Ohio, established in 1881; Rose Polytechnic Institute at Terre Haute, Indiana, in 1883; Armour Institute of Technology at Chicago, in 1893. These schools, and the others like them, have played an important part in the development of vocational education in the United States and have contributed much to the economic progress of the country.

Military Schools

Of the earlier vocational schools of college grade, however, the most unique are unquestionably the United States Military Academy, at West Point, and the United States Naval Academy, at Annapolis. The first of these established in 1802 to train officers for the American Army, was, until the opening of Rensselaer Polytechnic Institute in 1825, probably the only school in the country where a young man might prepare for the engineering profession. It early became famous as an engineering school and the rapidly expanding industries of the nineteenth century eagerly sought its graduates. In more recent years American Army engineers have become famous throughout the world for their exceptional engineering ability. The Naval Academy has much the same history since its establishment, in 1845, and ranks high in the technical fields relating to naval construction. Both these schools not only furnish instruction free, but pay salaries to the students who attend. Their student-bodies are carefully selected by

[15] Andrew Sloan Draper, American Education (New York: Houghton Mifflin Company, 1901), p. 198.
[16] Ibid., p. 198.

competitive examinations after appointment by members of Congress or the President of the United States.

Normal Schools

One other special type of vocational school which has played a significant part in the development of vocational education at the higher educational levels is the normal school. This institution, beginning as a private enterprise in 1823, came, after years of ridicule and opposition, gradually to be recognized as a permanent educational agency of the state. The growth of normal schools has been rapid since they became tax-supported institutions, and they have made an incalculable contribution to the progress of common-school education in the United States. Within recent years these institutions have raised their standards to such a point that many of them are generally recognized as of standard college rank, and most of them have now assumed the name, "teachers' college." These schools are unique in that they have grown up as state colleges entirely independent of the state universities and have confined their efforts to the single task of training teachers for the public schools.

Range of College Vocational Education

The progress of school vocational education of college grade has been continuous and, in recent years, remarkably rapid. The public demand for this type of training has increased so greatly since the world war, that the ability of the states to meet the demand has been severely taxed. The new vocational fields seeking recognition by the universities is greatly alarming the more conservative administrative heads of these institutions, and the end is difficult to foresee. The vocations for which training is now provided by institutions of higher learning are: medicine (all branches), dentistry, veterinary surgery, pharmacy, law, theology (with numerous subdivisions), hotel management, industrial-personnel work, social-service work, teaching (all branches), educational administration, public health work, athletic coaching, newspaper work, business administration (with numerous collateral activities), engineering (all branches), agriculture, diplomacy, homemaking, library work, music, painting(and allied arts), architecture, school-personnel work, and the dramatic arts. The number of vocational courses is constantly increasing and most of the factors in modern civilization suggests a continuous development, for many years to come, of vocational education of college grade.

Schools of Less Than College Grade

The development of school vocational education of less than college grade has been similar in many respects to that of the higher grades of occupational training. It has almost invariably followed the familiar steps of (1) some form of apprenticeship, (2) gradual growth of a few private training schools, and (3) the establishment of public training schools or classes. In the earlier years of vocational-education history this was, without exception, the line of growth. In more recent years, however, there is a tendency to begin with private schools, omitting the apprenticeship step. The new vocations rarely recruit from apprenticeship. This fact is significant and indicates not only the growing demand for vocational education of the school type, but it suggests the increasing need for speed and efficiency in the preparation of workers for the tense economic life of the present period. A most striking feature of contemporary life is the multitude of private vocational schools. The advertising columns of certain of the cheaper grades of popular magazines are all but filled with the advertisements of such schools, and an astonishing number of announcements appear in the daily newspaper. Back of the contemporary situation there is a long, continuous development, which is a significant part of the whole background of vocational education in the United States.

Agricultural Schools

Vocational education of less than college grade usually presents itself as a problem of four fairly distinct divisions; namely, agricultural education, commercial education, homemaking education, and industrial education. Each of these four divisions has had its characteristic growth, though the board outlines of development remain the same for all of them. From time immemorial the arts of agriculture have been handed down from father to son (or from mother to daughter) by means of an informal apprenticeship. "To become a farmer, one must 'grow up' on a farm"; is the accepted formula, even today. Farmers have always been slow to accept instruction relating to their vocation and have been, through the centuries, remarkably individualistic and conservative. The growth of agricultural education has therefore been slow and beset with many discouragements. In the United States, the national leaders very early realized the need for more intelligent methods of farming, and attempted to stimulate an interest in improved methods of agriculture by publishing books and pamphlets for farmers. Early American farmers, however, were not great readers and, for the most part, were contemptuous of "book farming." Further, to encourage efficient farming, the leaders of the late eighteenth and early nineteenth centuries in the United States, organized numerous agricultural societies. Probably the first of these was that of Philadelphia, which was organized in 1785 and had among its members Washington and Franklin. Such societies played an important part in stimulating interest in improved methods and were, in large measure, responsible for the later interest in agricultural schools. The idea of an agriculture school was too long a step forward for the pioneer farmer to take, though a few efforts to establish schools and professorships were made quite early. These early efforts did not originate with the farmers, and were concerned with the teaching of the natural sciences which were thought to underly farming, rather than with practical farming. Mr. True quotes the following from the transactions of the New York Agricultural Society: "That the legislature by an act passed April 11, 1792, had granted the sum of £1,500 for five years to the trustees of Columbia College for the purpose of endowing additional professorships, and that the trustees had instituted, among others, a professorship for natural history, chemistry, and agriculture . . . and that lectures had been given upon the different parts of the course."[17] True also mentions that the professor giving the course, wrote a pamphlet on the chemistry of manures. This indicates

[17] A. C. True, "Agricultural Education." Year Book of the U. S. Department of Agriculture, Washington, D. C. (1899), p. 161.

the character of the agricultural instruction found in the earliest schools. The war of 1812 seems to have halted all efforts to develop agricultural education until about the middle of the century. Between 1845 and 1850 a number of private agricultural schools appeared in New York and Connecticut. Between 1825 and 1840 the manual-labor movement created much interest. Its purpose was not primarily to teach agriculture, but rather to enable needy classical students to pay their way through college by means of part-time farm work. Its influence on the history of agricultural education, seemingly, was negligible. It is interesting, however, to notice that throughout the period practically all efforts to introduce instruction in agriculture were directed toward the colleges.

High Schools

"It was thirty years after the establishment of agricultural colleges in this country before the first successful agricultural high school was established."[18] It was a longer time yet, before agricultural education reached the "common schools." The first admittedly successful agricultural high school was that established by the University of Minnesota in 1888. Almost from the start, this school was a recognized success as a means of vocational education for farm boys and girls. It was soon followed by a similar school at the University of Nebraska. A few agricultural schools of secondary grade appeared in the years immediately following. Notable among these were the schools established by Alabama in each of the nine congressional districts of the state, the schools established by Wisconsin, the Baron de Hirsch Agricultural and Industrial School at Woodbine, New Jersey (1894), and the National Farm School at Doylestown (Pennsylvania (1897). A number of state and endowment schools for negroes also taught agriculture of secondary grade during that period."[19] The Year Book of the United States Department of Agriculture of 1899, states that, "There are a few private schools in which agricultural subjects are taught. There is some agitation in favor of the introduction of agriculture in the public schools, but no definite movement in this direction has as yet been attempted." In 1898 there were only ten agricultural high schools in the country, but in May, 1909, there were about five hundred,[20] thus the movement which started slowly had a rapid development. After 1900, agriculture came to be generally taught in the elementary schools, and numerous normal schools and agricultural colleges provided teacher-training courses for agricultural teachers. Before 1900, the efforts to push instruction down below the secondary grades were few and, in the main, ineffective. A summary of conditions at the close of the century states that, "Throughout the century efforts have been made from time to time to introduce instruction in agriculture into the common schools. These efforts have uniformly failed. . . ." "Thus far our common schools especially in the rural districts, have done very little toward introducing even elementary lessons on natural objects, and much less the systematic study of the elements of any natural science."[21] However, the early years of the new century witnessed a steadily growing interest in agricultural education of less than college grade until the passage of the Smith-Hughes Act in 1917. Since that date the development in the public schools has been remarkable. The Eleventh Annual Report of the Federal Board for Vocational Education (1927) shows that the number of reimbursement units federally aided, increased from 609 in 1918 to 4,897 in 1927," the number teaching federally-aided agricultural courses grew from 898 in 1918 to 4,804 in 1927; and the number of pupils in federally-aided classes from 15,187 to 124,937. In all public schools in 1927, there were 129,032 agricultural pupils.[22] The intervening years show a continuous growth from 1918 to 1927. Thus it appears that agricultural education of less than college grade has developed slowly from informal apprenticeship through the private-school stage to the modern type of tax-supported vocational school or class. To say that such a development has taken place, however, is not to mean that all or even most farmers are now trained in schools. The ancient procedure of learning by imitation, by trial and error, with an occasional word of instruction, is yet the chief means of learning to be a farmer; though the tendency clearly is in the direction of a general adoption of school vocational education for the agricultural callings.

Early Commercial Schools

Commercial education has followed very similar lines of growth to those of agricultural education. The keeping of accounts relating to property and business transactions is probably as old as civilization. The method of training youth to keep accounts and to perform other "commercial" transactions, which early peoples used, is difficult to uncover. The schooling given certain of the Egyptian youth destined to be scribes, was clearly in the nature of commercial or business education, as was indicated earlier in this paper, but there appears to be little evidence of similar training given in other ancient civilizations. One is left mainly to conjecture. The character of account keeping and the calculation of gains and losses suggest that throughout history some form of deliberate instruction has been given to those aspiring to the occupations practicing such arts. In the absence of direct evidence of the existence of schools, one must fall back on the supposition that the common practice was that of the time-honored method of apprenticeship. Early in European history interest in methods of bookkeeping appeared. Barber says: "It is generally accepted that the first writer on double-entry bookkeeping was Luca Pacioli, an Italian mathematician and professor of sacred theology, whose 'Summa de Arithmetica' was published in 1494. He was not the creator of the system, however, for single entry appears to have given way to double entry gradually in Venice, beginning about the year 1,000, and the double-entry system was known to Pacioli as the Venetian method."[23] He further says that, "A college of accountants was established in Venice in 1581. . . ."[24]

[18]Monroe's, A Cyclopedia of Education. "Agricultural Education," Vol. I, p. 64.
[19]Op. cit.
[20]Op. cit.
[21]Year Book of U. S. Department of Agriculture (1899), pp. 177–178.
[22]Second Annual Report (1918), Federal Board for Vocational Education.
[23]Edgar M. Barber, "A Contribution to the History of Commercial Education." Address delivered at the meeting of the Eastern Commercial Teachers' Association, Brooklyn, N. Y., 1903, p. 2.
[24]Ibid., p. 2.

The Collection and Use of Occupational Material in a Vocational-Guidance Program

Harry S. Belman, Division of Teacher Training and Research, Milwaukee Voational School

THE function of the educational system of the country is to help our youth plan for the future. This is done through instruction and through guidance in the fields of health, morals, education, and occupation. One of the most effective means of assisting young people to prepare for the future is to supply them with reliable and up-to-date data about the industrial and commercial opportunities open to them in their communities. This article deals with the method of collecting occupational information and of preparing it for use, and also contains some suggestions as to its practical application by different institutions. The plan outlined was developed in the division of teacher training and research at the Milwaukee Vocational School under the supervision of Mr. R. H. Rodgers, chief of the division.

The movement for the collection of occupational material assumed rather large proportions only a few years ago. Up to about 1920 there were only a few places in the country that had made any sustained effort to secure accurate and adequate information about the occupations in their communities. It is only recently also that any generally accepted technique of occupational research has been developed. Vocational-guidance departments in some schools were established after occupational research had begun, while in other institutions the collection of occupational material grew out of the demand for reliable information by those charged with the responsibility for guidance and counseling.

In discussing these problems and in presenting a technique of occupational research, it is well to bear in mind that it is possible to vary the method in order to meet different situations, even though the fundamental principles remain the same. Thus, a small institution which may not be able to give one individual the full-time responsibility of securing occupational information, may solve the problem by allowing him to spend part time at it, or several people may be assigned to handle the job in addition to the regular work. However, the method to be followed in the main is the same regardless of the community and the amount of time allotted to the work.

I. *The Problems of Collection*

Before one can commence the actual work of collecting occupational information, it is necesary to develop a plan of action. This involves a considerable amount of study and thought and requires a thorough survey of the entire industrial field in the community served by the school. In Milwaukee, for instance, it was found desirable to include in this survey the industries established in the various suburbs surrounding the city.

The census reports were studied carefully to determine the occupations and the industries that were the largest in numbers employed. The census also gave us some information as to the number of different occupations found in the community and in many cases the figures published by the government enabled us to tell the numbers engaged in each occupation and industry by age groups. A study of the census figures therefore gives information upon which to base a tentative program of research. In addition to the U. S. Census Reports, however, it is well to study whatever local material is available. The monthly reports of the Wisconsin Industrial Commission proved helpful in showing which industries and occupations were increasing and which were decreasing in the number employed. Local industrial figures published by the First Wisconsin National Bank were also used to assist in determining the occupations to be studied first. A survey of the student body will bring out data that is extremely valuable. Such a survey was made at the Milwaukee Vocational School and it was found that the students were engaged in approximately 900 different occupations and were employed by 1,624 different employers in 26 different lines of work. This study further showed us where employers preferred to place our students and by implication indicated some of the outlets for these youngsters. We found that the 14- to 15-year-old students were employed in about four or five different occupations, whereas the 17- to 18-year-old boys were engaged in about thirty different lines of work and the girls in an equal number. Opportunities for work increase as the age increases.

The information secured from the reports and the survey mentioned above formed the basis for the construction of charts and graphs. These were used as a guide in determining the order in which the different occupations and industries should be studied.

The first step, therefore, in occupational research is that of developing a plan of action. This may be done studying census reports, reports of the state industrial commission and of any local agency, and by making a survey of the student body. An analysis of the information obtained should be prepared in the form of a chart showing the occupations and industries in the order that they are to be studied. Numerical superiority alone is not the determining factor in the collection of occupational material. Such other points as opportunity for promotion, availability of jobs, hazards, expansion or contraction of the industry and the like must be given consideration in deciding upon the order of study.

In order to obtain accurate and adequate information it is necesary to determine the kind of information that is desired. So the second step in the collection of occupational material involves the determination of the questions to be asked and the preparation of a form upon which the answers may be recorded.

It is advisable to examine the forms or schedules used by others in making occupational studies so as to profit by their experience, but in all cases it is well to bear in mind that each institution may have a different goal in view. People in industry do not always have the time and are not always in the mood to answer a great number of detailed and what may seem to them foolish questions. This fact must be remembered in drawing

up the form to be used in making the study. I have seen forms that are elaborate to such an extent that it is doubtful if they can be used at all. The most practical form is the one in which the questions are limited in number but broad in scope and which are so flexible that they allow the investigator ample opportunity to develop them to meet any situation. The occupational information form developed at the Milwaukee Vocational School is extremely simple and can be used by anyone regardless of previous experience. This contains five major topics as follows:

A. Nature of the occupation or industry.
B. Conditions surrounding the occupation.
C. Entrance to the occupation.
D. Demand for labor.
E. Opportunities for advancement.

Each of the major topics includes a few subtopics which assist the investigator in securing the specific information desired. The following outline gives them in detail:

A. Nature of the occupation or industry:
   1. What do the workers do in the occupation or industry?
      a) Description of the work of each occupation.
   2. Organization by departments or divisions.
B. Conditions surrounding the occupation:
   1. Hours of work and wages.
   2. Time required to learn the occupation.
   3. Dangers involved, if any.
   4. Mental and physical strain, moral hazards, hygienic conditions.
C. Entrance to the occupation:
   1. Age and sex requirements.
   2. Physical requirements.
   3. Personality.
   4. Various ways of entering.
   5. Education and training needed and special abilities required.
D. Demand for labor:
   1. Is the supply of labor adequate to meet the demand?
   2. Seasonal demands or fluctuations.
   3. The future of the occupation or industry.
E. Opportunities for advancement:
   1. Lines of promotion within the trade or industry and rewards accompanying them.
   2. Trade, technical requirements, and experience necessary for advancement.

Each of the foregoing major topics with its subtopics is printed on a separate card. Five by eight cards are used for recording the data. If the face of the card has not enough space for the information, the reverse side may be used or an additional blank card of the same size may be attached. This scheme has been used successfully because it is simple and flexible, and because it enables the investigator to secure the maximum amount of information without creating a great deal of irritation. Since the success or the failure of a research problem depends upon the investigator, he should be given as much freedom as possible.

The third step in this procedure is the one in which the actual collection of the data is carried on. This divides itself into two phases of which the first is again preparatory. It is advisable that the investigator know something about the occupation or industry before approaching anyone in it. It is of great value to the research worker to have some knowledge of what he is going to see because it will enable him to grasp more quickly the details of the organization and its operations. He will not have to spend so much time in orienting himself and therefore will be at liberty to devote his efforts to other things. Familiarity with the terms and the technical expressions used in the industry are also of value in providing for a better understanding of the statements made by the people in the industry. Knowledge of the facts about the industry or occupation, such as its size, its products or its services, and its standing in the community, provide a method of approach and a means of gaining the good will of those who are to be interviewed. It is very important that the hearty cooperation of industry be obtained both for the purpose of speeding up the collection of occupational information and of gaining friends for the vocational guidance and the vocational-education movements.

This phase, then, includes the reading of whatever guidance material has been published, the consulting of technical journals, trade magazines, books, and government publications pertaining to the occupation or industry, and the studying of encyclopedias, historical references, and available advertising matter. When this information has been digested and assimilated and the other preparatory steps mentioned previously have been completed, the investigator is ready for the fieldwork.

Making the proper contacts and creating a good first impression are important features connected with the collection of occupational material. We know that people in industry dislike to be interrupted and resent the questioning of those who are connected in some way with the government. For the most part, they look with suspicion on any effort to secure information which they feel may be handed on to their competitors. In several instances I have been courteously but firmly refused admittance to parts of several of our largest plants where so-called secret processes were being developed. Several concerns have prohibited us from taking photographs of their operations because it was thought that they would disclose practices that were not common to the industry as a whole. Therefore, in order to secure a hearing and to receive a free rein in the investigation, it is necessary to make the proper contact and create a good impression.

In making contacts with industry it is advisable to attempt to meet the head of a business or an organization for the purpose of convincing him of the value of the work being done. It has often been found necessary to spend several hours at a time with the heads of some of the largest concerns impressing them not only with the value of vocational-guidance and occupational research, but also with the necessity and value of vocational education in general. When the president or general manager or the owner is won over it is comparatively easy to make headway with the others in the industry or occupation. It is equally important to secure the cooperation of the labor officials in order that their point of view and attitude may be determined.

Contacts may be made in several ways. An acquaintance or a friend in the industry may introduce the investigator to the proper person. Striking up an acquaintanceship with the secretary of a trade association such as the National Metal Trades Association, the Retail Grocers Association, the Typothetae, and others is a very effective way of making an entrance. These men may also be used as sources of information as to

representative shops, characteristics of individuals whom one is to meet, and other details. A third method of making a contact is to receive an introduction from somebody entirely outside of the industry. Finally, it may be necessary to make a blind visit trusting to luck that it will be possible to meet somebody who will give the investigator a hearing. The best policy to follow in every case is that of first discussing the matter with the head of the firm regardless of its size.

Those who are assigned to research projects of this kind should not make the mistake of attempting to cover every shop, or plant, or store, or office in the field in which the study is made. There is a certain degree of sameness about industrial and commercial institutions, and covering in detail the operations of representative examples will be sufficiently for the purpose of securing occupational information. After this has been done, it will be well to make visits to the other places to get an impression which will enable the investigator to present a well-developed picture of the industry he is studying.

Before starting out to make the detailed collection of the data it is best to secure a brief, general description of the industry in order to be informed about the relationship of the various departments and occupations to each other. This may be done by discussing the entire matter with somebody in authority who has the necessary information. The inspection of the operations should not be done in a haphazard manner. The order of procedure should be carefully planned.

In making the investigation it is necessary to observe carefully everything that is going on, to ask leading questions, and to make notes at the time of observation. Every part of the operations should be seen at first hand and the investigator should make every effort to get as close to the work as possible without causing too much disturbance. It may be necessary, therefore, to work late at night sometimes, or the individual doing this work may be required to get up early in the morning to reach a place at the time operations begin. Collection of certain material may involve inspection of several different plants to get the connection between the operations. In every case it is necessary to get right into the work in order to acquire the right perspective. Examples from my own experience will illustrate the point. Collection of the data on the telephone industry involved in the first place a visit to the vice-president of the telephone company to explain the purpose of the work and to convince him of its value. Then it meant working out a schedule of trips which had to be adhered to regardless of the weather. After that it included trips on company trucks with heavy construction crews to observe the erection of telephone poles and the digging of ditches for the laying of conduit, with line crews to witness the work of stringing cable and individual wires, with installers to see how telephones were actually installed in homes and offices, and with cable splicers to learn how cables carrying sometimes as many as 2,400 different wires were connected in both underground and overhead operations. Before the work on the telephone industry was completed it was necessary to take part in many other details of the operation of the departments which would take too much space to relate. When the work with one department was completed, it was found helpful to have another interview with its chief officer to clear up points that were in doubt and to get a broad view of the field covered. In this way successive interviews were arranged for with various department heads until the final one was held again with the vice-president who checked on all the material and arranged for the use of the company photographs. Similiarly, when data on the baking industry was collected it was found necessary to visit the largest plants in the city as well as the small neighborhood shop in order to obtain a clear idea of the entire industry. Operations in most bakeries are carried on quite late at night and very early in the morning. It was imperative, therefore, that the investigator be on the job at these times to see the operations at first hand. The study of the building trades necessitated extensive visits to contruction jobs at the different stages of erection and it required climbing scaffolding and ladders to upper stories of large structures as well as descending into excavation pits and cellars of various types of buildings. The metal-trades survey brought the investigator into close contact with the foundries, machine shops, forge shops, and other types of plants in this industry.

The general procedure followed in every study was the same. After the initial contact was made, it was followed by a detailed investigation of the occupation or industry. This meant sometimes four or five trips to a single plant to see all phases of the work. The detailed study involved the taking of notes whenever some new operation was observed or when the discussion brought out new points of information. It is well to remember that notes should be taken at the time the observation is made because it is not possible to keep all the details in mind especially when one is not familiar with them. The inspection trips were always followed by final interviews with those in authority in each industry. After representative places had been visited, the material was ready for preparation so that it might be used in the classroom.

II. *The Preparation of Occupational Material*

The second major problem in the work of collecting occupational material is that of preparing it in suitable form for use in the classrooms, placement and counseling offices, boys' clubs, public employment offices, and in personnel departments in industry. This requires, first of all, a decision as to length and method of expression. We have found that it is best to be brief as far as is consistent in order to hold the attention, but never to the point where necessary information is omitted. The simplest method of expression has been found to be the best in our own experience, and, no doubt, in the experience of others. We have found also that it is good practice to include a set of questions with each study which serves the purpose of developing the class discussion.

The preparation of the manuscript requires organization of the notes and reference to historical and technical material bearing upon the industry or occupation in particular. This involves considerable reading and research especially when little has been published that may be used. This phase of the work serves the purpose also of securing a list of supplementary reading which the students may use in their study of the industry. One of the most important features of the preparation problem is that of presenting the manu-

script to those who are qualified to read it for comment, criticism, and constructive suggestions. Whenever it is possible, the manuscript should be given to employers and representatives of labor at the same time. On the whole, it will be found that it is not difficult to secure the cooperation of industry, although now and then a suspicious individual will appear who doubts one's motives. The comments have ranged from a simple O.K. to a very detailed statement of corrections needed to make the material accurate and true to conditions. It is interesting to note that in some instances individuals have objected to the material because they felt that it painted particular occupations in too rosy a light. They wished to have the opportunities minimized and the dangerous and disagreeable features emphasized. On the other hand, there were others who insisted that their particular occupations were not as dirty and dangerous as had been pictured. Criticism of this nature must be met tactfully and ignored, if possible. Occupational data, to be of any value, must be absolutely accurate and should not be presented in such a way that it will make an occupation too attractive or vice versa.

After the content of the monograph has been prepared, criticized, and corrected, it is necessary to turn attention to the physical features of the publication. An attractive cover is essential, as well as a good grade of paper and a size of type that is easily read, because material of this kind must be dressed up so that the students will desire to read it. The size of the monograph is also important. It must be of such a size that it can be easily handled, will have ample space for the insertion of good-size illustrations, and will provide for considerable reading matter on each page so as to cut down the total number of pages. A booklet that is attractive in every feature is one that will receive the most attention from the students, and since they are those who need the information it is necessary that this point be kept in mind.

Mention has been made of illustrations. These may be either in the form of charts and graphs or they may be photographs of the actual operations discussed. The charts and graphs may present promotional opportunities, they may show the organization scheme of an industry, or they may illustrate statistical data relative to the size of the industry in comparison to others. Photographs are sometimes furnished by the industries, but more often it is necessary to hire a photographer to do the work. The best practice is to hire a good commercial photographer who will do the work under the direction of the investigator. It is necessary that the investigator accompany the photographer in order to select the scenes that will most properly fit in with the material to be published. This again will necessitate considerable fieldwork in visiting the various places. Occasionally an employer will be found who will not allow pictures to be taken in his plant, but on the whole no difficulties will present themselves in this phase of the work.

Finally, the job of preparing the material is not finished until arrangements have been made with the printer with regard to the purchase of material, the reading of proof, and the preparation of cuts. Costs must be given careful consideration, the style of printing must be decided upon, and the time of publication must be determined.

III. *Using Occupational Material*

The third major problem is that of the practical application of the occupational data after it has been put into usable form. The use of such material will vary with different situations and in different types of schools. High schools, for instance, may use it in the classes on occupations or vocations wherever they have been established. Where such classes are not in existence, it is practicable to combine occupational information with the course in social science, civics, or English. This data may be discussed and read during class periods or it may be used as supplementary reading material. The bulletins or monographs on occupations may also be placed in the school shops where the instructor may use them to discuss careers with the students, especially when they express a desire to make a change. Shops in the part-time vocational schools, as well as the shops in the full-time schools may adopt this procedure. Where the shop period is long enough it may be advisable to set aside twenty minutes or half an hour for discussion in topics related to the trade among which there may be such questions as entrance to the occupation, requirements for promotion, details of operation, educational qualifications, and the like. While the instructor may be well informed about his own trade, he will find that accurate information about other occupations will facilitate the discussions and enable him to give advice that will benefit the students.

The vocational schools may use the collected occupational data in the academic classes, or they may develop special courses for this purpose. At the Milwaukee Vocational School there has been prepared a general social-science course called "Personal Problems and Responsibilities" which devotes a part of the time to a study of the occupations of Milwaukee. By means of this course every student is given the opportunity to learn something about the commercial and industrial life of the city. It may also prove practical to present information of this kind to students entering the vocational school to aid them in making a choice of a shop class.

Copies of booklets on occupations may be placed in the school library to stimulate the interest of the students in their future prospects. The counselor's office or the placement department office may use this material to great advantage by placing copies of it where it will be easily obtained by the students. This practice will relieve the tedium of a long wait and will speed up the interview because in many cases the young person will have had the opportunity to decide tentatively at least what he would like to do on the basis of what he has read while waiting in the placement or counseling office.

Occupational information will prove valuable in connection with trips to plants and industries. It will serve to call the attention of the students to what they ought to see and will familiarize them with conditions of the work before they make the trip, and after it has been completed, it will be of assistance in helping them to retain a clear impression of what they saw. Those schools that hold annual guidance conferences with business and professional men may use this material to pave the way for more definite questions by students and more detailed and definite answers by those assisting in the conference.

Other organizations besides schools can make use of bulletins on occupations. Social service organizations such as the Y.M.C.A., and Y.W.C.A., the Big Brothers and Sisters, orphan asylums, and public charity institutions can use such information to good advantage in their counseling and guidance work. The junior employment service of the state, the personnel departments of industrial establishments, and the public library can serve young people by keeping on file any printed material on guidance that is available.

In discussing this last phase of the problem, I have tried to make a few general suggestions that will be applicable in most cases. No doubt, many more ideas will be developed in the group meetings. We must remember, however, that occupational information is of no value unless it is reliable and up-to-date, is presented in an attractive manner, and is put to practical use both in the classroom and elsewhere. It is a waste of time, money, and energy to get the data together only to allow it to be idle.

Summary

Guidance activity may be divided into the following parts:

A. Administration.
B. Research.
C. Instruction.
D. Counseling.
E. Placement and follow-up.

Each of these elements is equally important in developing a guidance program. It may be expedient to stress one of them at the expense of the others during the developmental period, but we will never have a smoothly functioning department until all of the elements receive equal attention. The collection of occupational data is only one phase of research in guidance, but it should come rather early in the program since it is the basis of other activities. The classroom teacher, the counselor, and the coordinator are benefited because they are enabled to give accurate information and sound advice on the basis of the knowledge obtained from the occupational studies. The student, who is the most important factor in the situation, is benefited because he is enabled to receive adequate data and reliable counsel from those who are expected to give it.

Aviation in Secondary Schools[1]

Andrew Roswall, Boston Trade School

PART I

CONCURRENT with the present interest in aviation there has been a steady demand that schools teach the science and mechanics of this new method of transportation. Boston is no exception, hence the writer was put on the job two years ago to see how this could be accomplished.

At the outset, certain facts had to be established, such as: what are the subjects related to aviation; what materials and equipment are used, and how are they obtainable; what are the opportunities of employment after completing the course; and what is the cost of introducing this work in the school.

In the collection of this information, the writer gratefully acknowledges the assistance of the Department of Commerce, Navy Department, War Department, The Daniel Guggenheim Foundation for the Promotion of Aviation, and many army and navy officers and civilians who are interested and actively engaged in aviation.

The result of this preliminary survey established the fact that there is a wide field of possibilities for the schools to cover, and this fall the Boston Trade School opens its doors to the first group of students who train to become airplane mechanics.

Aviation has the most interesting and romantic history of any means of transportation. There is a wide difference between the homemade plane in which the Wright brothers, Orville and Wilbur, made their first flight 25 years ago, and the latest German plane, carrying a hundred passengers and operated by twelve motors. And the end is not yet, for aviation will undoubtedly advance as much, if not more, in the next 25 years.

It took Lindbergh's flight to arouse the slumbering interest in aviation. His trip accomplished what he wanted it to do; namely, to establish this new means of transportation not merely an acrobatic stunt or a sure method of suicide, but the surer way of bringing the world closer together by a quicker method of transportation.

The youth of today is clamoring for more and more knowledge about the subject of aeronautics and aviation, and the prospective fliers are legion, but the question arises, To what extent can the public schools train these young men for aviation as a vocation and not as a hobby or as an amusement? Aviation today is past the stage of merely being entertaining. It is a serious business proposition where millions of dollars are involved, and it requires serious-minded young men who are willing to work for advancement.

To determine what courses are to be taught involves such questions as: age of pupils, space and equipment available for the work, phases of aviation that are to be studied, how the industry is organized today, etc. Then too, it is well to know that men employed in aviation are listed as follows by the Department of Commerce.

1. Pilot.
2. Mechanic.
3. Aeronautical engineer (airplane and engine design).
4. Factory man.
5. Airport designer and constructor.
6. Airport ground man (helper).
7. Radio operator (airport or airplane).
8. Traffic agent.
9. Advertising and publicity man.
10. Salesman.

[1]This is one of a series of articles pertaining to the subject of aviation that is being considered for many a school, and the writer will explain how such courses may be organized, content of study, and details that will assist such schools planning a course in this subject.

TIMING A LIBERTY MOTOR

REPAIRING WING AND REPLACING FABRIC

Any of these positions may be obtained after one has equipped himself with the proper training, and there are other positions of specialized and executive nature for which one can train himself.

Physical as well as mental qualifications must necessarily determine the student's selection, as it is obvious that a pilot must have mental qualifications that are not necessary for a traffic agent, and a mechanic is generally a different type than a salesman. Generally speaking, the student must fit himself for the job for which he is qualified.

The first position mentioned is piloting. The writer cannot at this time recommend that any public school undertake the responsibility of the training of pilots. The training of pilots should be left to the army or navy, private schools or flying clubs, as no public school could assume the responsibility nor the expense of such training. To become a pilot requires almost physical perfection, and requires at least a well-rounded-out high-school education, and preferably two or more years of college training. In addition to this, the student is required to put in ten hours of flying, at thirty dollars an hour, and forty hours of solo flight, at twenty dollars an hour, before he can obtain a Department of Commerce license as a pilot.

This license is called "industrial license" or "limited commercial license" and permits only restricted flying by such a pilot. To obtain a transport license, such as is required by pilots of mail and passenger planes, it is demanded that such a pilot must have at least two hundred solo hours in the air, a rigid physical examination, and mental test before he can qualify.

It is therefore evident that it is out of the question for a school of high-school grade to undertake this type of training successfully.

In the Department of Commerce bulletin on aeronautics we read, "There is a shortage of trained men for positions as mechanics and ground engineers, but it is doubtful whether or not private flying and mechanic schools can furnish the necessary training; because, up to the present time, most of these schools have not developed to the point where they are equipped to meet the standards set by air-transport companies.

"Applicants are preferred who are aeronautically trained mechanics or who have had experience as airplane-factory mechanics. Men are also considered for positions who have been trained as automobile mechanics or in trade schools. Training in a trade school, if thorough, is considered very desirable."

The foregoing extract contains the whole situation in a nutshell, it states: "but it is doubtful whether or not private flying or mechanic schools can furnish the necessary training," in which the writer fully agrees, but the public schools can, for the following reasons.

Millions of dollars worth of material are not available to accredited and properly vouched for public schools by the Army and Navy Departments. This material has been adjudged obsolete or unfit for military purposes, but by an act of Congress it may be assigned to public schools and colleges for instructional purposes.

This material includes everything from a complete ship to cotter pins. Planes and parts of planes, motors, instruments of every description, in fact, everything is obtainable that is necessary to fully instruct students to become airplane mechanics.

From time to time new lists are being issued of material available for schools. At times complete motors or ships that have never been used, but that have become obsolete through new inventions or improvements, may be had for the cost of crating and transportation.

Any secondary school teaching mechanics may become eligible for this material by corresponding with the War Department, Department of Aeronautics; Navy Department, Department of Aeronautics; Washington, D. C. Of course, the material received must be inventoried and accounted for to the government once a year.

An aviation mechanic differs from any other mechanic in many respects. He must not only be a Jack-of-all-trades, but he also must be master of all. This is due to the fact that a plane is constructed quite differently from any other kind of vehicle. Wood, metals, fabrics, wires, and many other materials are used in its construction, and a mechanic must be able to handle them all.

Woodwork, sheet metal, welding, sewing and splicing of wires are the fundamental mechanical processes involved on the ship and on the controls, and in these the mechanic must be thoroughly trained. Then also, he must be familiar and able to handle all kinds of motors, including radial and rotary; overhaul timing and wiring; assemble, adjust, and inspect every detail of the ship from motor to empennage.

The student for this kind of course must be carefully selected. He must be of the mechanically inclined type of boy, because the average will not do, as too much depends on the mechanics who take care of planes, and are responsible for their safety. For this reason all airplane mechanics are required to hold a Department of Commerce license which is issued only after a very thorough examination by that department.

Graphic Arts in the Gary Schools

William O. Wallace, Gary Public Schools, Gary, Indiana

PART II

(Part I appeared in the July, 1929, issue of the Industrial-Arts Magazine)

Under the W-S-P system every student is permitted to progress just as fast as he can in his shopwork. No effort is made to keep the pupils in groups or classes. The boy or girl who is taking two periods of printing a day can progress just twice as fast as the student who takes the work but one period.

Throughout the entire course the lessons are designed for one period each. There are 55 lessons and five examinations in each semester's work; however, since every student goes ahead as fast as he is able, it is not unusual to have a first-semester boy complete seventy or eighty lessons the first half year, neither is it unusual to have some students who do not get beyond fifteen or twenty.

These lessons are prepared especially for this school. They deal with the work exactly as arithmetic is taught, simple elementary lessons for beginners, and carefully graduated to suit the age and ability of the student as he progresses. In this respect all textbooks offered on the subject are at fault, they insist on attempting to cover a kindergarten to journeyman course in a few hundred pages, while in the Gary system the child is taught to creep before he can walk. The lessons are so arranged that they carefully follow the requirements of the trade. There are seldom more than four pages to a lesson and there are several hundred lessons. When the student has completed his work, he is not as far along as the usual textbook hopes to take him, but there is nothing left out of his education. What he has been taught has been thorough.

All of the work during the first two weeks is desk work. The lessons are very simple, explaining for the 10-year old, a history of the alphabet, a description of type, a child's history of printing, the parts of a piece of printer's type, the layout of the case and the interesting history of J and U and why they are nonalphabetical in arrangement, the reason for the location and the varied sizes of the type boxes, the origin of a composing stick, and a little story of how it got its name, and, in general, a storybook tale of the romance and attractiveness of printing. The lessons are all of schoolbook character, which helps to retain the academic atmosphere; a feature highly desirable in school centers where the technical classes are housed in a separate building. It aids in eliminating the usual spirit of release or boisterousness felt by students in transferring from one building to another.

Several of the early lessons are devoted to distribution. Each pupil is provided with an empty case and a few lines of straight matter to distribute. The plan of teaching distribution the first thing following the desk work, is radically at variance with the accepted methods of teaching printing, but Gary's entire educational work is noted for its fearless disregard of old pedagogical routing; so the protests that arise against this system by other teachers, is inevitable and ignored. No effort is made to compromise to avoid criticism. Results are what the Gary schools are after, and results are what they have been getting for almost twenty years.

Printing and manual training were the first two extracurricular activities added to the Gary schools almost twenty years ago, so considerable actual experience is back of the system regardless of what may be theoretically correct. It has been satisfactorily proved that distribution is the first thing the new student should learn. He must have type in his case before he can hope to set it up, and he must learn to distribute before he can get type in his case. His first efforts at composition teaches its own lesson if the distribution lessons have been slighted.

All printing teachers agree that distribution is the greatest problem with which they have to contend, except in the few instances where a nondistribution system is in use. They also agree that the most exasperating little thing that is continually before them, is the insistence of the beginners in trying to read their sticks upside down, and backwards. When distribution is taught first, the student has learned how impossible it is to handle type, or read type that way, for he must spell his words into the case during the distribution process; incidently, another big little thing is taken care of at this time, the distinguishing of p, b, q, and d, which are identified by their use in the word rather than by their appearance.

Straight matter, usually dead jobs from the ordinary run of work, is used for these distribution lessons. Almost invariably the student will pi a part of his first "take" of straight matter, and the resultant difficulty in identifying the letters above mentioned teaches him how necessary it is to keep his type assembled and compact. The distribution exercises start with a single line of type, and increase to several lines in the same lesson. As the student gains dexterity in handling the type, he is required to increase the size of the group of letters he picks off. At first small words and syllables are all that he can handle, but before the lessons are finished the average boy handles several words at a time.

The lessons requiring the first use of the composing stick deals a little more extensively with the history and invention of the stick, and its use is described quite fully. A nonadjustable stick is used in the first

lessons, so that the emptying of a stickful of type is properly learned. It has been noted in most classrooms that when an adjustable stick is used, the first thing the boy does is to take the knee of the stick off when he removes the type, and it is hard to break that habit.

The setting of simple exercises, ordinary justification, and the tying up of small jobs, and the locking up of the type the student has set, is ordinarily the height of attainment of the one-period pupil at the end of his eleventh lesson. A few practice chases are kept on hand in the composing room for the early lock-up lessons. Although the student has not, in reality, got far enough along to be taught lock-up, it is quite essential at this period of the lessons to let him have a little experience in that branch to teach him, by his own experience, the necessity of accurate justification. Seldom is it necessary to stress the need for accuracy in justification after one actual experience on the part of the pupil in attempting to lock up loose lines.

The lessons used in the Gary schools are grouped in sets of eleven, and in the examination, the student is required to answer any ten of the questions submitted. Following is the examination sheet for the elementary or first group of lessons.

EXAMINATION

1. Describe the nick on type and state what it is for. Explain the difference between the nick and the groove. Describe the difference between the serif and the kern. What is "type-high" stated in decimals? What are the ascenders and descenders?

2. What is a point, stated in common fractions? What is a pica, stated in points? What is a nonpareil? What is the difference between seven picas and seven points? How long, stated in picas, is a column of 8-point type ten inches long?

3. Draw from memory a chart of a California Job Case, and indicate the location of all capitals, lower-case letters, punctuation marks and figures.

4. How thick are the usual leads and slugs? What is a 3-em quad? How is it different from a 3-to-em space? Why should the term "en-spaces" be used in preference to "en-quads." Why should leads and slugs not be mixed with type?

5. Describe the proper method of handling type for distribution. With the nick upward, state on which side of the stem the ball is on, for the lower-case letter p, d, b, and q.

6. Describe a stick and a galley. What is the knee of a stick? What are the two surest signs of incompetence in a beginning printer? Why is a stick so named? What is a good printshop motto?

7. What is justification? Why is it an operation demanding great accuracy? What happens if a line is not properly justified? Why should spacing be comparatively even? Is it good policy to use one or two em-quads for justifying a line?

8. Define the following words: stick, galley, make-up, furniture, quoins, spaces, justification, quads, composition, job work, ad-work, straight matter, pi, hell-box, slug, leads, pica, point, em, unit, rack, alley, en, chase, planer, proof, make-ready, stone, quoin key, proof planer, font, copy, cut, brayer, wrong font.

9. Show what the proof marks are for the following operations. Change defective letter, push down space, turn over, take out, insert, space evenly, put in colon, take out space, move to left, indent for paragraph, close up, put in comma, insert space, spell out, insert apostrophe, put in Roman letters, straighten lines, wrong font letter, transpose, put in caps, put in lower case, insert hyphen.

10. Make a pencil sketch of the arrangement of furniture around a form to permit even pressure on all parts of the type. Make a sketch of a chase, with quoins and form and furniture properly placed, to avoid slipping of furniture, loosening of quoins, or damaging of furniture by pressure from the quoins.

11. Define type face as compared with basic design. Name some of the distinctive fonts of a type family. Describe text, script, and Roman type. State why Gothic type is improperly named.

THE INDUSTRIAL UNIT IN THE NEW SENIOR HIGH SCHOOL, FORT SMITH, ARKANSAS

A. E. Smith, Fort Smith, Arkansas

(Continued from page 426, November, 1929, issue of the Industrial-Arts Magazine)

Provision is made for storing the unfinished products of the woodworking shop by building 30-in. shelves along the side of the passage wall. This does away with having the machine room cluttered up with unfinished products. The student may secure his unfinished material while coming to class and also may return it while leaving the class. This arrangement does not take up any of the class period and has proved very satisfactory. The woodworking shop is also provided with a washroom just as the other shops are.

In the finishing room is located a 6-ft. spray booth with spray gun, exhaust fan, and special light arrangement. An air line is provided for the spray work that runs from the air compressor in the auto shop, so that the compressor is used for the spray work, and also for the auto tire and other auto work. The finishing room also has a cabinet to store the finishing material in, and a metal-top table.

The woodworking shop makes practically all of the furniture and cabinet work needed for the school system. The ten type cases in the printing shop were built in the woodworking shop as were all of the cabinets needed for the other shops, and for many other departments of the school system. Under this arrangement the machinery will soon pay for itself by doing this schoolwork.

A standing agreement is arranged with the furniture factories to employ the student product of this shop in the furniture factories and is proving quite satisfactory to all concerned.

The drafting room is one of the most modernly equipped that can be found in any school. It will be noticed that the blue-print room is directly connected with the drafting room and can be easily supervised by the teacher. The blue-print room is provided with a vertical blue-print machine and washer, and a sink also has been placed in this room.

The drafting room is equipped with 24 drawing benches with adjustable tops. Each desk can accommodate six students per day. The teacher's desk has a place for storing the finished drawings of each class through the day, and there is also provided a wall cabinet for any other work that may need to be under lock and key. Each of the 24 desks is provided with a drawing set, wood scale, 45- and 60-deg. triangles, and 1 amber-edge T square. The other articles necessary for drawing are provided by the students. A heavy oak stool is standard equipment with each desk. Cork bulletin boards run the whole length of one side of the room, so that good drawings and examples of correct methods in drafting may be displayed.

INDUSTRIAL-ARTS MAGAZINE

EDITORS

E. J. Lake *J. J. Metz* *S. J. Vaughn*

AERONAUTICS IN HIGH SCHOOL

The rapid advances made in aeronautics in the past few years have arrested the attention of everyone. The accomplishments of men like Lindbergh, Byrd, and others, have aroused the popular imagination, and it is but natural that youth as represented by our high-school students, should picture themselves emulating the Lone Eagle who has aroused their ambition and fired their imagination.

With the boys clamoring on the one side, "Why can't we take up aviation in high school?" and industry's loud appeal for trained workers on the other, it can be readily seen why the ambitious teacher of shop subjects should be captivated by the idea of making aviation and aeronautics part of the curriculum of his school. And this is as it should be. The school should ever keep abreast of modern developments. It should do everything in its power to make it possible for the student to become acquainted with the direct application of the principles which he learns in the classroom. This direct application of the principles should not be merely in an experimental way. It should be done as nearly as possible under the actual conditions in which they must be applied later on by the student in industry.

This thought, however, must be applied with judgment. It does not mean that the ordinary high-school shop should be equipped with the ponderous machinery found in the modern up-to-date industrial shop. There should, of course, be representative prototypes of this heavy machinery in the school shop so that the boy becomes acquainted with the principles on which it works. In the same way the present interest in aeronautics should not lead the teacher into losing his sense of proportion, when he is trying to visualize what he is going to include in his courses at school.

There seems to be a tendency of late for high schools to go in for gliding. The idea is that if a boy learns how to operate a glider, he is well on his way to learn how to pilot an airplane. Much of that may be true, but are the schools prepared to assume the responsibility which actual flying or gliding places upon the school administration?

Gliders are one-man affairs. They have no dual controls. From the very first ascent, the pilot must rely on his own ingenuity and level-headedness in the manipulation of his plane. The building of the wings, longerons, ailerons, controls, etc., may no doubt be done by high-school students, but after the glider has been built, what next? Do these boys who possess the skill to build the glider, also possess the skill to handle it when in the air? No doubt if the weather and land conditions are right and the glider has been properly designed and built, the danger is not so very great.

But what if the teacher does not know exactly how the different parts of the glider should be made? What about the squall that may suddenly strike the wings of the glider soaring through the air? Will the boy at the controls, who is probably making his maiden trip, know what to do, or are we prepared to see him come down, maiming himself for life or killing himself outright?

It is true, much can be learned from gliding, but we must not lose sight of the fact that the manipulation of the glider requires the judgment of more mature minds than those possessed by the average high-school student.

In Germany, where this sport is taken up seriously in schools, the participants are technical students of university age. Probably their age is not much above that of our high-school students, but the background of technical knowledge is at least some safeguard for them.

At the National Air Races held at Cleveland several weeks ago, gliders built by high-school students were barred from entry in the gliding events unless they were operated by licensed pilots.

With the foregoing in mind, are we ready to put gliding into our high schools, or is it not much better to confine work in aeronautics to aerodynamics, groundwork, the making of models, and the study of airplane design and construction?

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APPRECIATION OF TOOLS

The other day, while walking along the street, the writer observed a street cleaner busily engaged in scraping the handle of his broom with a pocket knife. He had finished about one half of the work and was assiduously working on the remainder as though the job was of the highest importance.

Recently in a comic strip, the title and author of which are not at present recalled by the writer, the conversation of a home-coming iceman was described. He was telling his wife about the fine new ice tongs which the company had furnished him that morning.

Neither of the men described in the foregoing were employed at skilled occupations, yet in each of the two instances just cited, the worker showed considerable interest in the tools which he used at his job.

No doubt the freshly scraped handle brightened an otherwise drab and ordinary day for the street cleaner. No doubt it aroused in him the pride of possessing something in the way of a tool which was a little more worth while.

Likewise the iceman who compared the new tongs with others that he had seen or handled, felt proud that he had one that might be rated the best or at least one of the better kind.

If indications of this kind are found in the trades which require but little skill, how much more should we expect to find them in the highly skilled trades, and it is the more skilled trades that are being taught in the high-school shops.

Surely, then, it ought not to be a very difficult matter to arouse in the student a sense of appreciation for the tools which the carpenter, the machinist, the draftsman, the printer, or the electrician uses in his daily work. Nor ought it to be so very difficult to enlist the help of the student in keeping these tools in good condition. Yet these subjects must be dealt with in a very definite way if the lessons are to be

successfully brought home to the boy. The boy is not yet an artisan. To him the drawing instruments, the fine chisel, the composing stick, the lineman's pliers, are merely incidentals, and the teacher must make a conscious effort to instill in him the pride which the good workman has for his tools.

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PROPER HABITS

Recently a teacher who was trying to impress his visitor with the fact that he was making special efforts to instill in his students the habit of thinking through each job, and then to plan the work, was asked for a copy of the analysis of the trade which he was teaching, and an outline of instruction of his course. He informed the visitor that he was too busy to make such an analysis and that while a tentative outline of instruction had been made, it was not in the proper form for distribution.

No doubt this occurrence is quite consistent with the inconsistency of human nature. Here was a man priding himself that he was instilling certain habits in others, when he himself had neglected to make them his own. No doubt he was in earnest, and no doubt he was doing a fairly good teaching job, nevertheless, he failed entirely to embody in his own life those things which he thought were so important in the lives of his students.

Introspection is a good thing when properly used. It will often disclose to the individual a lack of the same habits which he so much deplores in others. It is true, that thinking through a job and then planning the method of attacking it, is what ought to be taught to the pupil. But the teacher ought to realize that his own job, which is as important as any that might be mentioned, requires the same kind of preparation. He, too, must think through his job, and if he does he will have his analysis made. Then he must plan how to do his job. If he does that, he will have the outline of instruction as a matter of course.

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REAL MODESTY

The fiftieth anniversary of the invention of the incandescent lamp has just been celebrated. The far-reaching effect of this invention can hardly be visualized. It is interesting, therefore, to note that the man who is accountable for it is still living and has actually profited from his invention. It is interesting to note also that this man, in spite of the great value of this and other of his numerous inventions, has yet remained thoroughly human. His statement at the celebration that his achievement in inventing the incandescent lamp would have been absolutely impossible were it not for the pioneer work done by many of the scientists who had experimented with electricity prior to his day, is an example of modesty which must endear the venerable old inventor to us. It is a fine illustration of the modesty which is part of every really great man.

Incidentally, President Hoover at this celebration, also showed the same kind of modesty when he insisted that Edison, the inventor of the incandescent lamp, should occupy the seat of honor at the banquet which was given in commemoration of the event. It was not only a mark of respect of a younger man for an older man, but it was effacing a precedent which has long been established that the President of the United States should always occupy the seat of honor, at any function at which he attends. His act on this occasion was a tribute to genius, but it is no less a tribute to the modesty of the man who now holds the reins of Government in our country.

The example given by these two men, both outstanding in their own fields, may well be held up for emulation in the classroom.

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WHAT OF THE SUMMER?

Henry H. Batchelder, San Diego, California

Not "What of the night?" but "What of the summer?"

That long vacation trip with the family; the new contacts of a summer session; or the experiences with tradesmen in the shop or on the job; all can have their effects on the approach of another year. They are glorifying and broadening when linked up with the classroom and work; but if discarded as only pleasant memories of recreation—they lose their force, their vim, and their strength.

With the opening of school come thoughts of class procedure. Thoughts meaning more to the shopman than to others of the teaching profession, for they open alternations of method numbered far into the dozens.

True indeed, the shop teacher can follow his age-old customs. He can begin on projects, or reference readings, lectures, tool manipulations, stock reports, and systems, or material changes and rearrangements; or he can, with enthusiasm, begin with new improved methods, fresh from summer sessions and interviews and contacts of related industrial fields.

Perhaps the new methods are not easy at first; new problems spring forth; students must be oriented; supervisors convinced. But the spirit of adventure in another proved field of approach, has its far-reaching advantages. Nothing is more gratifying than to see a new method of approach — bud take form — and then burst forth with marvelous ease and supremacy. Nothing is more satisfying than the realization that you have actually mastered another good "take-off."

Now, after the satisfaction of a change has come and gone, what have you? You have changed; you have tried and conquered; you have enlarged yourself — and better or not as the new method might be — you are "out of the rut" and are receptive. The wall of self-satisfaction and selfishness is broken, and the sun beams with a new strength.

All summer long the average shop teacher makes resolutions — you won't do this next year; you will do that; this will be different; that will remain the same; you will have the upper hand. But the ruts of last year must be filled with the gravel of new methods that cover up with lasting flexibility and gloss.

The links of those summer occupations are in place and can only be welded to the new year by active, conscious concentration of practice. Those boys before us are the material; the new methods and ideas represent the compound and the heat. We have the hammer — hit it hard, and hit it true!

What of the summer? ? ?

Printing Christmas Cards in the School Shop

R. Randolph Karch, Supervisor of Printing, Steubenville, Ohio

"Card publishing has grown up like the gradual swell of a new and beautiful music — a music of man's love for man. It has perfected and scientifically organized the creation and distribution of a method whereby the great and the humble, the rich and the poor, the talented and the illiterate, the toiler and the man of leisure, can express in words, as though from their own hearts, the great love all men have within them for their fellow men." — Harry W. Brown in "The Romance of Greeting Cards," by Ernest Dudley Chase.

IT is said that the Christmas greeting card had its origin in England about the year 1846. Joseph Cundall, an artist, is given credit for being the first publisher of Christmas greeting cards. Cundall himself, however, says that Sir Henry Cole, of London, was the originator.

The greeting card, as a Christmas offering, at once found favor with royalty, and later, because of its inexpensiveness became equally popular with the middle classes.

Louis Prang, a lithographer of Boston, who is also given credit for introducing art education into the public schools of America, published the first greeting cards in this country in 1874. The best cards ever produced up to this time, it is said, were made by Prang.

Conservative copy and lack of ornamentation lasted through the nineties, when the greeting card idea was taken up as a means to display the chirography taught in the schools. Later came the deluge of copy and ornamentation. Most of us recall the gaudy, cotton bestuck cards, heavy with imitation ice and snow.

Although rather expensive in most cases, made-to-order variety greeting cards for Christmas, seems to be most in favor. Many printers and engravers are enticing purchasers away from the hackneyed greeting-card phrases to the original booklet style — often picturing the entire family with their words of yuletide cheer.

Solomon Eagle, in his "Essays at Large," comments on the drabness and sameness of Christmas greetings — many being useless harbingers of questionable holiday cheer. It is a fact that some cards are rather dull and colorless. This, no doubt, accounts for the new trend in Christmas-card designs.

The designing, laying out, and printing of Christmas cards makes a very instructive as well as entertaining printshop problem. The printing student frequently laments that he may never make anything like the boys do in woodworking, and really it is almost impossible to allow a class of 100 or more pupils to print individual Christmas cards. The project however, in spite of difficulties, is possible in small advanced classes. Where classes are too large or the time is too limited, a dozen or so cards may be planned by the group, and a selection made by each pupil, who then merely does the imprinting of his name on the cards chosen.

The foremost difficulty encountered in the printing of Christmas cards in the school shop is the lack of sufficient typographical material, such as Christmas-cut scenes, two-color cuts, and holiday ornaments. A great deal can be done, however, from simple materials found in almost any school shop. A perusal of the leading printing trade journals will bring to light many firms specializing in the sale of stock cuts, electrotypes of line etchings and halftones of every sort, which may be used for this kind of work. The type founders, too, are continually adding to their stock of Christmas type-cuts. Christmas scenes may be thus purchased in one, two, three, and even four colors, quite cheaply. This enables the printing teacher, for just a few dollars a year, to build up a large and well-chosen selection of Christmas-card decorative material. A small charge to each student might be made in order to help defray this expense.

Decorative Christmas borders can usually be bought quite reasonably from the nearest trade-composition plant, where a varied assortment of border is stocked.

Stocks of varied color and texture suitable for the made-to-order card may often be obtained from old paper samples, etc. Perhaps a photographer or commercial printer has scraps of waste stock of suitable widths for cards. Many of these business men would be glad to have these odds and ends removed from their shelves, especially if good use was to be made of it.

Silhouettes may be cut in linoleum, and may also be made from typographical material. For instance, a Christmas tree may be made very easily with two-point brass rule, heavy side up, using em and half-em sizes, so that each piece will be graduated to three-point steps, starting with a one-em piece and increasing to about eight ems. The rules can be spaced to suit. Tree trunk and base may also be formed with brass rule.

A lesson in bronzing may be incorporated in the making of cards. The use of gold and silver bronze creates many beautiful effects.

Thermography may also be practiced on the cards, thus giving the pupils an idea of how this growing specialty is produced. Sprinkle powdered rosin over the ink after printing the card, and hold it over a heater. An electric toaster is useful in this work. Although being a rather haphazard method of creating "raised printing," this work can be produced rapidly after one becomes accustomed to it.

Or a subject may be printed, and later cut out by means of soft-steel cutting rule bent to the required shape. The assistance of the woodworking department could be called in to make the required wooden bases for the dies.

Small boxes of 250 odd-shaped envelopes can be purchased from the paper jobbers, and the cards printed to fit these standard-size stationers' envelopes.

Where lack of facilities and time prevent the creating of the entire Christmas greeting card, lithographed, engraved, and printed cards in many colors may be purchased from firms specializing in this work, or from paper jobbers. Blank spaces are left on these cards for the imprinting of sentiment and name. This insures the matching in of type faces for the sentiment and name. Many beautiful designs in gorgeous colors are to be had. Advertisements of these cards appear in the trade journals. Envelopes to match are provided, and cards and envelopes are sold in boxes of from 25 to 100, depending upon the size and cost.

The dozen or so reduced illustrations shown with this article are examples of work set in the junior-high-school plant in which the writer is the instructor. Reg-

GREETINGS

I wish you in all
Sincerity a
Merry Christmas
and a
Happy New Year
and hope
that 1929 will
be one of
bountious plenty

RALPH ACTION

FIG. 1

It is only once a year
That they say these words to you;
We are wishing you
A Merry Christmas,
And A Happy New Year, too.

And the angel said unto them
Fear not: for, behold, I bring
you good tidings of great joy,
which shall be to all people.
For unto you is born this day
in the city of David a Saviour,
which is Christ, the Lord.

★

Charles Montgomery
Christmas 1929

FIG. 2

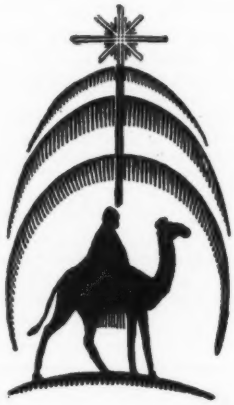
MAY the Great :: Holiday Spirit be very considerate of you this year

JOHN ABEL

Steubenville, O.
1929-30

FIG. 3

FIG. 4



Star, you can lead
Me all the way
Through darkest night
And brightest day

★

A Christmas Greeting from

Howard Archer

FIG. 5

A	B	C	D	E
F	G	H	I	K
L	M	N	O	P
Q	R	S	T	V
W	X	Y	Z	

With these movable types
Bequeathed to us by
Gutenberg,
I wish you a very
MERRY CHRISTMAS
and a
HAPPY NEW YEAR

Lawrence Baim

FIG. 8

When you wake up in the morning
To the shouts of
"Merry Christmas!"
—Add mine, too!

William R. Peters

FIG. 6

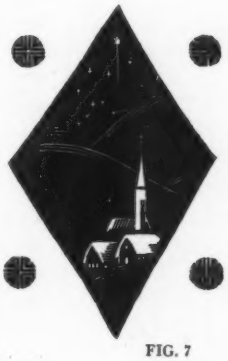
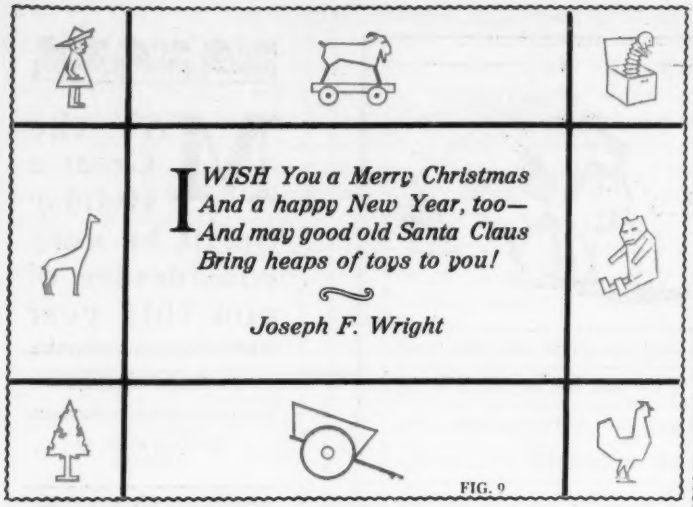


FIG. 7



I WISH You a Merry Christmas
And a happy New Year, too—
And may good old Santa Claus
Bring heaps of toys to you!

Joseph F. Wright

FIG. 9

LET no pleasure tempt thee, no profit allure thee, no ambition corrupt thee, no example sway thee, no persuasion move thee to do anything which thou knowest to be evil. So shalt thou always live jollily, for a good conscience is a continual Christmas.

—Poor Richard

LAWRENCE BRITTAN
1929—1930

FIG. 10

Seasons Greetings FIG. 11

We meet many friends as we go along,
Who like ships that pass in the night—
We meet one day and they drift away—
Silently—out of sight.

Then there are other friends whom we chance to meet,
Who prove loyal and staunch and true—
And tug at my heart when the Yuletide starts—
Just such a good friend are you.

DARRELL KELL

FIG. 12

Giddap, old boy, and quickly pass,
Put on more speed, step on the gas!
And hustle to my friend and say:
"I wish you joy this Christmas day!"

PAUL TIPPENS

FIG. 13

ME AN' ROVER WISH YOU
A MERRY CHRISTMAS
AND A HAPPY NEW YEAR

BERNARD WHITE

FIG. 14

ular foundry equipment is used, with stock cuts and linotype border. Some of the designs and ideas are new, while others are selected from the shop's "idea file."

Figure 1 shows a simple little card, made up from fonts of everyday type, one foundry ornament, and brass rule. Printed in two colors on a colored stock, it makes an attractive greeting. The shape is also a relief from the usual wide form.

Figure 2 makes use of a biblical quotation with suitable illustration. This is set in all foundry materials. Colors bring out the beauty in this piece of composition.

Figure 3 consists of two pieces of 18-point Christmas border and Caslon Black. This produces a neat typographical arrangement.

Figures 4, 7, and 11 are offered as suggestions for cutting linoleum-block Christmas decorations. These subjects, cut larger of course, are appropriate for the Christmas and New Year greeting.

Figure 5 is a simple silhouette which may be cut in linoleum. The type face of ecclesiastical design, makes this a simple, beautiful, and easy-to-set greeting card.

Figure 6 is a card that is different. It is one that will bring a smile to the face of the reader. It is appropriate from one who is humorous, to one who also loves a joke. This is an instance of an individualized card.

Figure 8 is a good card for the printer-student, or for the printing department itself. It consists entirely of simple materials which may be found in most small plants.

Figure 9 requires a font of Christmas toys from the type founder. This, plus brass rule, and a good sentiment printed to suit, make up an original greeting. It is also a rather simple piece of composition, that boys can set.

Figure 10 is a rather serious type of greeting. Suitable, perhaps, for the pupil or teacher of printing, as it quotes America's most famous versatile printer. A regular stock type founders' cut is used with linotype border. A folder style would no doubt be a good form for this greeting.

Figure 12 shows how an inexpensive stock electrotype may be used. A suitable verse gives the card the spirit of yuletide friendship.

Figure 13 introduces the comic element into the made-to-order greeting card. It is especially adapted to the student who drives the family car. A piece of linotype Christmas border at the head and foot brings in the touch of Christmas ornament needed.

Figure 14 is an individual card for the boy who owns a dog. A stock cut, two styles of type, and linotype border is used, producing a humorous and effective greeting.

The Value of a Notebook in Printing

Leroy Brewington, Pittsburg, Kansas

A NOTEBOOK should be kept by every student of printing whether he is pursuing an elementary or an advanced course. The value of such a book is practically indispensable. The exact nature of the material which any particular class should keep in a notebook, must depend upon the judgment of the instructor, because the type of class governs the kind of notebook material that is to be preserved. For example, the printed specimens in the notebook of a student in a tryout course would not be the same as those in the book of a vocational student. In our department in the Pittsburg Senior High School, we use the following information for the correct keeping of a notebook. It covers most of the jobs printed in a high-school shop, and serves as a good reminder for the student in collecting the different types of printing specimens. It also is a checking sheet for the instructor in assigning the gathering of material for the printing student's notebook.

I. Lecture notes and printed information given by the instructor during the class periods.

II. Correct procedure in proofreading with the standard proofmarks and their variations as used by the different large printing establishments.

III. Printshop kinks and "short cuts."

IV. Questions and answers in condensed written reviews.

V. Student's shopwork exercises including original copy, first proof with student corrections, second proof with instructor's corrections, O.K.'d proof, and finished product or specimen of each job.

VI. Stylebook of printer's English, trade terms, preparation of copy, special styles, standard forms, etc. (Most commercial establishments and high-school shops have their own printed stylebooks.)

VII. The following list of good, printed specimens collected from various sources, especially from commercial printing establishments:

1. Programs in one and two colors.
2. Membership cards.
3. Business and personal cards.
4. Menus in one and two colors.
5. Envelope corner cards.
6. Advertising and novelty blotters.
7. Business and personal letterheads.
8. Folders and pamphlets.
9. Tickets, tags, and labels.
10. Small booklets.
11. Motto cards in one, two, and three colors.
12. Tabular work.
13. Cover and title-pages.
14. Billheads and statement heads.
15. Rule compositions.
16. Announcements and invitations.
17. Diplomas and certificates.
18. Window cards (placards) and dodgers (handbills).
19. Circular letters, cards, and folders.
20. Bookmarks.
21. Bank checks and drafts.
22. Receipt blanks.
23. Greeting cards.
24. Small calendars and pads.
25. Daily and weekly newspaper advertisements, with and without "cuts" or illustrations and borders.
26. Magazine advertisements.
27. One-, two-, and three-column newspaper headings.
28. Streamer newspaper heads.
29. Miscellaneous examples.

PRACTICAL-ARTS INSTRUCTION

The purpose of practical-arts instruction should be given an appreciative understanding of tools, materials, processes, and design as found in the work of the world. All of the instruction should be given from the consumer's point of view. Practical-arts work should be used as a vehicle to carry a rich educational content.—*F. T. Struck.*

New Orleans' Contribution to Vocational Education

Robert Brydon, Isaac Delgado Central Trades School, New Orleans, Louisiana

PART II

The trades shops are large and well adapted to the needs of the respective trades. In each of these is partitioned off a supply room, a toolroom, a class-lecture room and a glass-inclosed office, wherein the instructor may do his necessary office work. The school telephone system affords ready means for the instructor to communicate not only with the main office but with the other shops.

When at first the shops were equipped with machinery, etc., there was enough money available to have purchased the very latest improvements in such equipment. The guiding thought which prevailed in the selection of this equipment, however, was the duplication to a reasonable extent of the equipment actually in use in the various local shops. For instance, the machine shop might have been equipped entirely with motor-driven lathes, etc., but the majority of shops in New Orleans use belt-driven machinery. Hence, in order to accustom the student while in school with the conditions he will have to encounter after graduation, belt-driven machinery was installed.

Health and safety are paramount issues at Delgado. Every piece of machinery is fitted with safety devices to reduce inherent dangers to a minimum. A dust-collecting system and incinerator is in active operation each school day. Bubbling spring fountains installed in each shop and corridor supply cold drinking water to the students. There is a shower-bath room in addition to the necessary toilets on each floor.

In addition to this, there is a first-aid organization, composed principally of members of the office force, with the necessary medicines and supplies to care for minor ailments, wounds, etc.

Tuition is free to all white boys and men residing in Louisiana, 14 years of age or over. All shop tools are loaned free of cost and the only expense incurred by the student is for drafting equipment, two sets of overalls or other shop clothing, and such current details as lunch money, car fare and small supplies of paper, pencils, ink, etc.

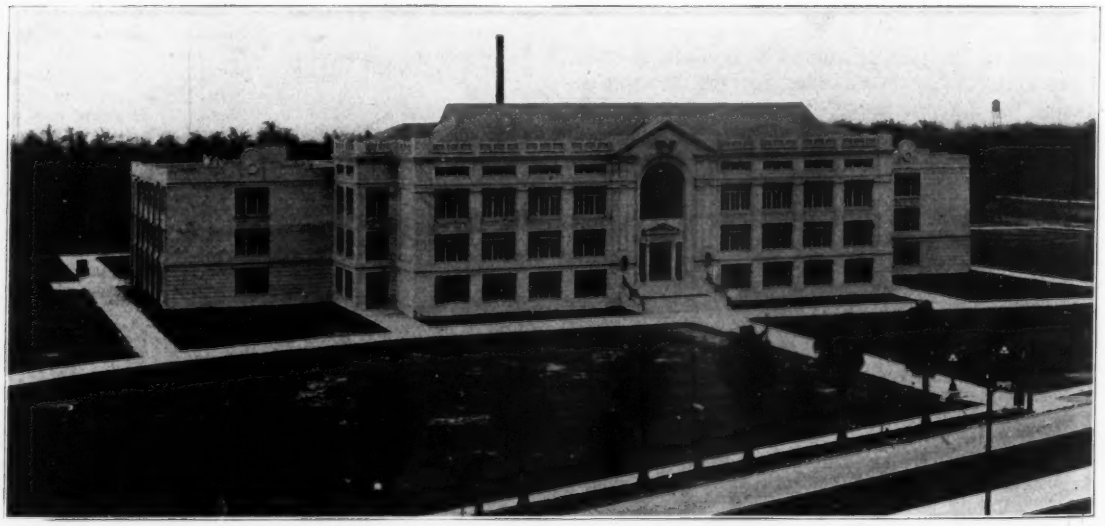
Boys 14 years of age who have completed the grammar-school grades, or the equivalent thereof, are admitted to any of the trades except those of machinery and electricity, where the nature of the work involved justifies the requirement of additional maturity.

Boys of the required age, but who are deficient as to previous schooling, are admitted to the trade, but are required to review or work up to the required standard in mathematics and English, the supplementary subjects given with each course. In the mechanical and building trades drafting and applied science are also included.

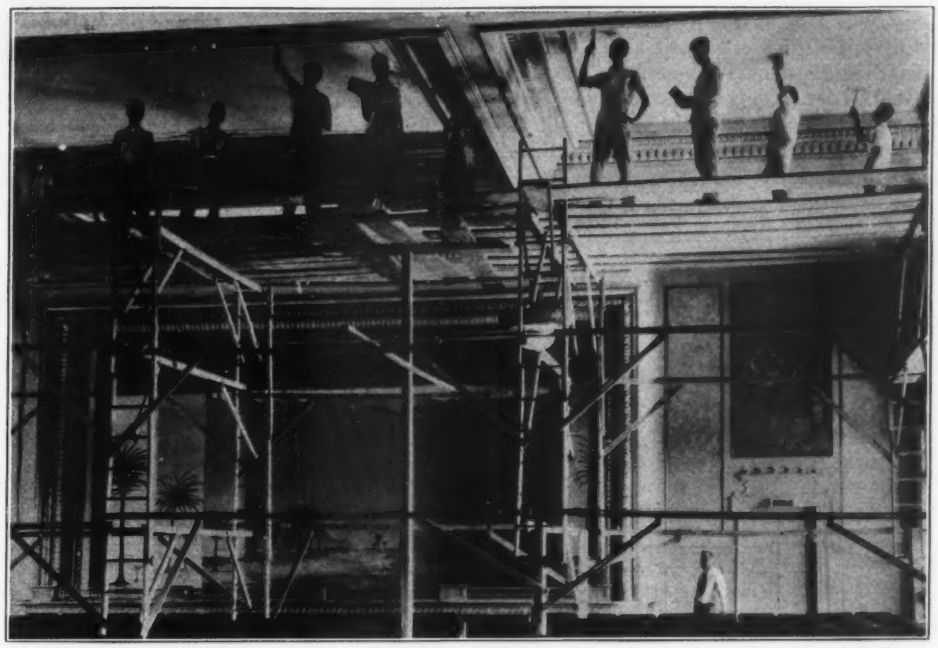
Individual instruction is the rule throughout the school, and therefore the students are not required to use textbooks, although trade handbooks are used. An interesting exception might be mentioned in the case of the courses in shop English in which trade journals are used as texts. Seventy such publications are subscribed to by the school for this purpose in addition to a dozen or more manufacturers' house organs. These publications supply the basis and subject matter for oral and silent reading, grammatical rules, letter writing, news gathering, and even order writing, using the advertisements particularly for the latter purpose.

The length of the school year is eleven months, running from September to July, both inclusive. The normal full-time attendance of day students is about 375. This does not include the part-time students. The evening classes held each year, run six months, from October to April. In these, the same subjects with the addition of several special courses, are taught to about a thousand men who attend two nights a week.

Each of the trade courses extend over a period of three years and lead to a full trade diploma. The night classes, however, involving a much lesser course



ISAAC DELGADO CENTRAL TRADES SCHOOL, NEW ORLEANS, LOUISIANA



FRESCO PAINTING
Students at work on ceiling decorations in school auditorium. The stage scenery and murals were painted by previous classes.

content, require four years of their completion, after which a "Certificate of Attainment" is issued.

Day-school graduates entering trades in the city in which the apprentice system is in vogue are generally credited with three full years of their apprenticeship in recognition of their work at Delgado.

Credit cards testifying to the satisfactory completion of two or more years' work in the respective trades are also given the students both day and night. This card is given the boys particularly for the benefit of the prospective employers, who might otherwise be victimized by persons pretending to be Delgado-trained when they were not. These cards indicate just how far the student has progressed in his trade.

Most of the departments in the day school and evening school run to full numerical capacity. When one student is dropped, a new one is immediately called in. There are at present over 900 names on the waiting list, waiting to be called.

Trades and industrial schools are so well established nowadays that it is not necessary to go into the details of the usual courses taught at this school. Therefore, further description of the shops and training outlines at Delgado will not be gone into. It might not be amiss, however, to mention a few of the departments which are unusual or for other reasons may be interesting.

There is a very lively vocational-guidance department at Delgado, in which a new student is given every opportunity to express himself. Probably a more truly expressive name for that shop would be department of individual differences, for that is exactly what its courses try to disclose. Of course, there is a regular schedule of work to be followed which involves five short elementary courses—woodwork, sheet metal, wrought iron, electricity, and pipe fitting. Other departments contribute elementary drafting, English and mathematics to the vocational-guidance classes. In their shop, however, under the guidance of Mr. A. V. O'Neal, who has many years of this kind of experience to his credit, these youngsters may branch out into projects which do not come directly in their training outlines. For instance, if one of these students who may not have shown any particular fondness for anything heretofore, suddenly requests permission to build an airplane, radio, model boat, or something of the kind dear to the heart of the boy, he is not only given permission to do the work in the shop if he is reasonably qualified to do the work, but is given all the instruction and assistance that may be necessary. Just such an experience may be the thing to bring out his latent ability and settle his problem as to trade selection. Of course, it may not, but the boy generally has an improved attitude thereafter toward his other work and his vocational problem is more easily solved.

These youngsters have, in the short periods of time allotted to them in this prevocational class, done some very high-class work.

Two subdivisions of the drafting departments are particularly worthy of mention. In the mechanical-drafting department it was found that the graduates more quickly earned a satisfactory living wage along the line of structural steel drafting than in any other. This subject had been given in a very rudimentary way heretofore, but about two years ago it was decided to extend and develop this branch of the work, and a very competent instructor was engaged to take charge and conduct this course in the evening school. Preliminary requirements which the student must satisfy before he may enroll in this class, were set up, and they reduced the number of students who could enter. Day students however, to a great extent, take advantage of the course and fill up the classes.

The other course referred to is a development of

mill detail drafting. This also is a special class which is under the direction of a specialist along this line. The mill detail draftsman is generally an expert mechanic of this trade who is engaged in laying out to a full-size scale the work to be done in the mill. It is quite a departure from the usual line of architectural drafting as taught generally. This class also, is developing in a very satisfactory manner and is quite popular.

terias, of the city as well as on Pullman diners and steamships. "Visitors invited to go through our kitchen" mean something here, for students do the cooking in the open and not behind closed doors.

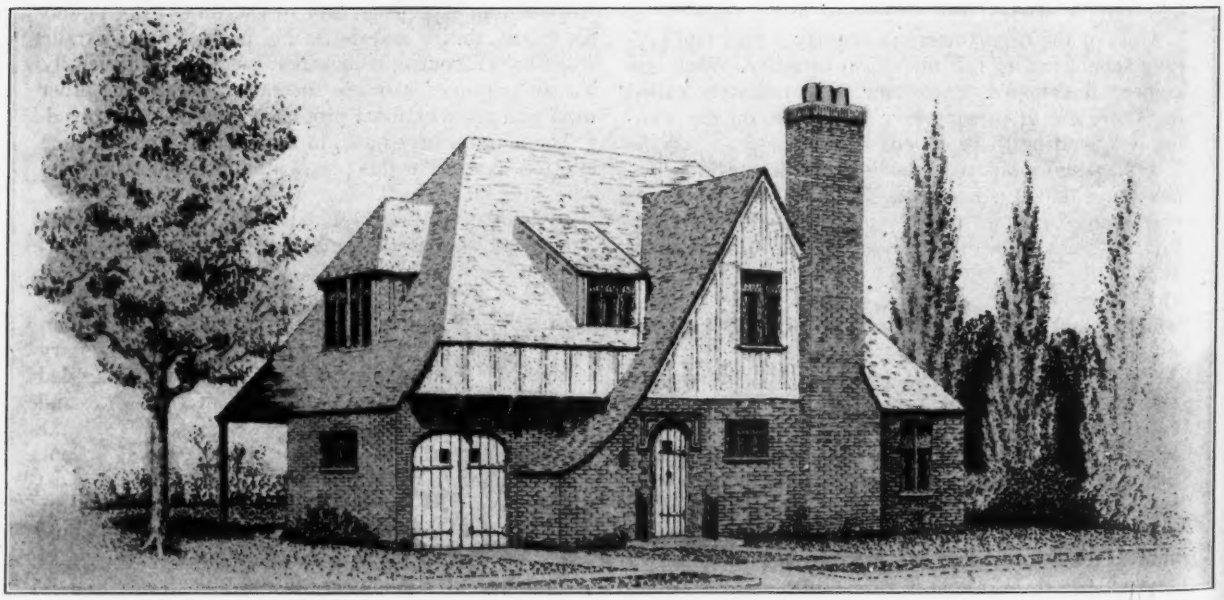
Finally, a word about athletics, which in this school takes the form of intershop contests in all of the usual sports. There is no first team representing the school in any event. The intershop contests give

CARPENTER STUDENTS AT WORK ON PORTABLE SCHOOL BUILDING

This scene is on the grounds of the school. Other types of frame buildings are also constructed on the grounds, which comprise 57 acres. Thus the student does not have to leave the immediate jurisdiction of the shop instructor at any time and still has the advantage of full-sized practical work. The balmy open climate makes possible an all-year outdoor program. Isaac Delgado Central Trades School, New Orleans, La.

The cafeteria, presided over by Mr. John H. Breland, constitutes the "shop" of the department of commercial catering (stewardship and cooking) wherein the students of this trade prepare and serve 300 or more hot lunches each day to students and faculty. Like all the other trades in this school, the length of the course is three years. Without an exception all graduates of this department find employment, and even many of the undergraduates are employed in the trade and may be found in the hotels, restaurants, cafe-

exercise to a much larger number of students and there is a great deal of interest displayed among the students in these events. There are ample grounds available for these sports, and a clubhouse fitted with lockers and showers for the use of the players was built recently by the students of the carpentry department and fitted up by the plumbers. Winning teams are publicly presented with trophies, pennants, etc., and there is a great deal of friendly rivalry between the teams representing the various departments.



This illustrates a Pen and Ink Rendering which won the first prize in the Industrial-Arts Contest held at Iowa State College in the spring of 1929. The drawing was made by a student from the Abraham Lincoln High School, Council Bluffs, Iowa, under the supervision of R. M. Hammes, teacher.

TRACING SUPPLEMENT No. 159
THE INDUSTRIAL-ARTS MAGAZINE,
DECEMBER, 1939

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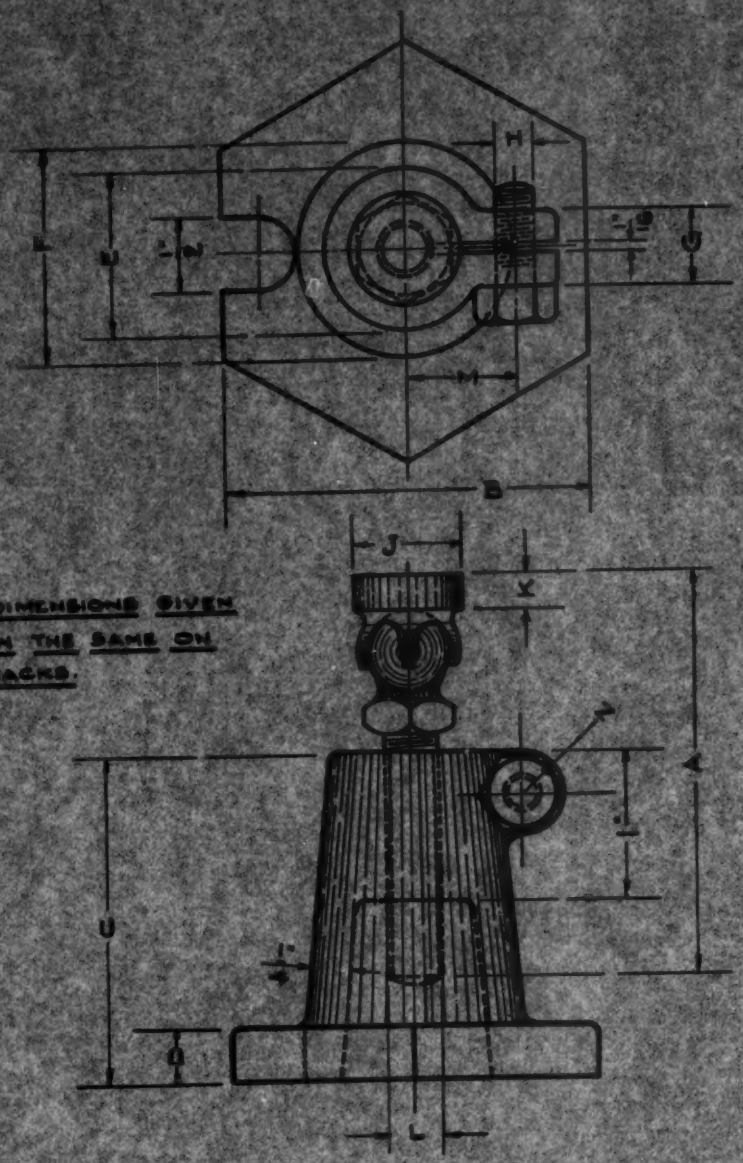
LEVELING JACKS



NOTE:
ALL DIMENSIONS GIVEN REMAIN THE SAME ON ALL JACKS.

SIZES	A	B	C	D	E	F	G	H	J	K	L	M	N
1	$2\frac{3}{4}$"	$2\frac{1}{2}$"	$2\frac{1}{4}$"	$\frac{3}{8}$"	$1\frac{1}{8}$"	$1\frac{1}{2}$"	$\frac{1}{2}$"	$\frac{1}{4}$"	$\frac{3}{4}$"	$\frac{1}{4}$"	$\frac{3}{8}$"	$\frac{1}{4}$"	$\frac{9}{32}$"
2	$3\frac{3}{4}$"	$3\frac{1}{2}$"	3"	$\frac{1}{2}$"	$1\frac{1}{2}$"	2"	$\frac{3}{4}$"	$\frac{3}{8}$"	1"	$\frac{1}{4}$"	$\frac{1}{2}$"	$1\frac{1}{8}$"	$\frac{5}{16}$"
3	$5\frac{1}{4}$"	$4\frac{1}{2}$"	$4\frac{1}{4}$"	$\frac{5}{8}$"	2"	$2\frac{1}{2}$"	$\frac{1}{4}$"	$\frac{3}{8}$"	$1\frac{1}{8}$"	$\frac{5}{16}$"	$\frac{5}{8}$"	$1\frac{5}{16}$"	$\frac{5}{16}$"
4	$7\frac{1}{2}$"	5"	$6\frac{1}{4}$"	$\frac{3}{4}$"	$2\frac{1}{2}$"	$3\frac{1}{4}$"	$\frac{7}{8}$"	$\frac{1}{2}$"	$1\frac{3}{8}$"	$\frac{1}{8}$"	$\frac{3}{4}$"	$1\frac{1}{2}$"	$\frac{3}{8}$"

Designed by C. H. Niemann, Hammond, Indiana

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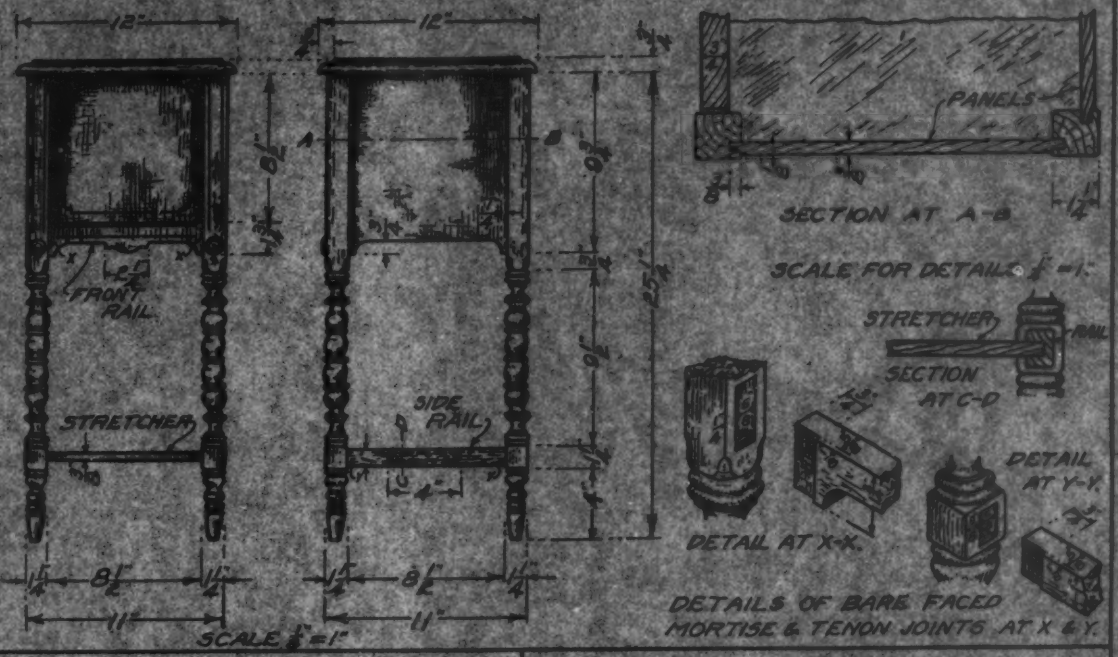
ADV. WOODWORK
CLIFFORD B. SMITH

SMOKING STAND

PROJECT INSTRUCTION SHEET — A-104



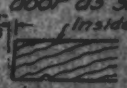
THE PROJECT— A walnut, mahogany or a lacquer finish is suitable for the Smoking Stand.

Refer to the following Unit Instruction Sheets:—
W-1, Squaring-Up Process; W-100, Wood Turning; W-20, Curved Edges; W-104, Tongue & Groove Joint; W-120, Mortise & Tenon Joint; WT-37, Sandpaper; W-4, Hinges; F-5, Staining; F-1, Shellac; WT-46, Clamps.

MATERIALS— Walnut, mahogany, gum or whitewood, hot glue, brass butts, knob, stain, shellac, pumice and rotten stone.

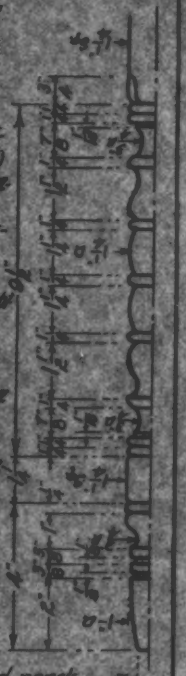
TOOLS— Jointer, jack plane, cross-cut hand saw, circular saw, try square, mortising machine, speed lathe, turning tools, "1 and "00 paper, bar clamps, framing square, hand screw, gouge (¾" inside bevel), band saw, veining tool, hand drill, screwdriver, 1" chisel, mallet, rule.

DIRECTIONS— 1— Make out a bill of material on your working drawing.
2— Saw out the rough stock for the different items of the bill. Suggestions for doing this will be found in step 2, A-100.
3— Square-up to size the legs, panels, rails, stretcher and top. Use your judgment as to which surfaces need to be planed. See W-1.
4— Center and turn legs. See W-100. Sand.
5— Layout the mortices and tenons for joints at x-x and y-y. See W-120.
6— Instructor will cut the tongues and grooves for the three panels. Have the circular saw set for proper depth of cut. See W-104.
7— Layout the mortice for the housed mortice and tenon joint at C-D.
8— Cut to the curved outlines on the panels and front rail. See W-20.
9— Sand legs, end panels and lower rails thoroly with the grain until every blemish is removed. See WT-37.
10— Glue end sections, using hot glue and bar-clamps. See WT-46. (Scrap wood under clamps.) Test the work for wind, squareness and straightness across.
11— Assemble and glue end sections, stretcher, front rail and back panel after sanding. Test for wind, squareness and straightness.
12— Fit bottom in place.
13— Square-up top. Have instructor make the ⅛" x ¾" groove on circular saw. Plane round with block plane. Sand.
14— Fit door. Allow ⅛ clearance on each edge. Bevel edges of door as shown at -A-.



-A-

15— Hinge door. See W-4. Set hinges entirely in door.
16— Put in veined lines.
17— Fasten top with blocks. Match grain of blocks with top and panels.
18— Sand, stain, apply finish. F-5, F-1, F-9.



QUESTIONS— How does the mortise and tenon joint compare with the dowel joint? In step 17 above, why do we cut the glue blocks with the grain running the same as the top and end panels? Why are doors beveled on the inside edges? What are the respective benefits of the loose and tight pin hinges? What are butt, tee, strap and table hinges used for?

UNIV. OF ILL.

Designed by Clifford B. Smith, Buffalo, N. Y.

PROBLEMS AND PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in woodworking, turning, patternmaking, machine-shop practice, sheet-metal work, forging, foundry work, auto mechanics, auto electricity, electricity, architectural and mechanical drafting, printing, bookbinding, concrete work, farm mechanics, home mechanics, and other lines of industrial-arts work are desired for consideration.

DOLL CART OR DUMP CART

C. Anthony Van Kammen, Grand Rapids, Michigan

With the Christmas season at hand, most woodwork boys are anxious to get started on a present for their smaller sister or brother. A doll cart is not very boyish, but if the top is left off it has many uses as a boy's toy. With the back board pinned near the top edge, using two round-head screws, and with a small spring catch in the center at the bottom edge, the problem makes a very satisfactory dump cart. Two small cleats may be nailed at the back ends, on each side, so that the end board may be withdrawn or slid in place at will.

If time is available, every boy should make a working drawing, full scale, and design the type of box for the cart that he would like. (Fig. 1.) Some have slanting ends, others are square throughout. If a dump cart is desired, the method of putting on the back board should be shown in the drawing, as is done in the detail at the top of Figure 1. When the problem is designed strictly as a doll cart, some type of hood or top is required. Suggestions are given in Figure 2. Whether a working drawing is made or not, a full-size paper pattern should be made of the shape of the sides. The size of the cart may be varied as well as the design, but of course, this will necessitate a stock bill to correspond. The stock bill which follows, is for the doll cart shown in Figure 1. The finished sizes of the stock are given.

Bill of Material

1 pc.	10 x 4¼ x ⅜	Gumwood	Hood sides
2 pc.	11½ x 3⅜ x ⅜	Gumwood	
1 pc.	10⅞ x 6¼ x ⅜	Gumwood	Box bottom
2 pc.	6¼ x 3 x ⅜	Gumwood	Ends
1 pc.	7 x 8½ x ⅛	Gumwood	Hood top
1 pc.	6¼ x ½ x 5/16	Gumwood	Hood front
1 pc.	9½ x ¾ x ¾	Maple	Axle
2 pc.	5 x 5 x ½	Maple	Wheels
4 pc.	30 x ½ x ⅛ or		
1 pc.	30 x 7/16 x ½	Oak	Handle
1	¼-in. dowel rod 2¾ in. long		Crosspiece
2	1-in. cotter pins or 1¼ in. No. 16 wire brads		
2	1¼-in. round-head blue screws, No. 6		
4	⅝-in. washers		
4	⅞-in. box nails.		

The body or box of the cart is assembled first. If the girl's toy is constructed, stock for the sides will have to be glued up. The two hood pieces are made of one piece, as shown in the bill of material. Find the center of the stock and cut to the line AB drawn at an angle, as shown in the working drawing, Figure 1. Another part that requires gluing is the handle which must be bent to shape at the same time. The bent handle has the advantage over the straight type, in that it permits the box of the cart to ride in a more horizontal position. It is quite easily made and may be built up from two, three, or four thin strips as desired. The two-strip handle will need a ⅛-in. thick strip on each side to prevent the handle stock from breaking while bending. When more than two pieces are used, the stock is thin enough so that it will bend freely, without the possibility of cracking or splitting. Various methods of bending the handle were tried out. The most satisfactory method, with the least amount of equipment, was the one shown in Figure 3. No hot water or steaming box is necessary. All that is needed is a 1-in. thick board, a chalk line or paper pattern to bend to, the required number of oak strips for building up the thickness of the handle, some 6d common nails, and cold glue. A waterproof cold glue is very desirable. When gluing, see that all pieces are in contact with each other from one end to the other. When necessary, bend a nail or drive in an extra one to hold the strips together. The use of several pieces of thin wood, with varying grain, besides making the bending of the handle easier, also makes it stronger. Allow the glue to dry hard before withdrawing the nails which hold it to shape. Plane the sides

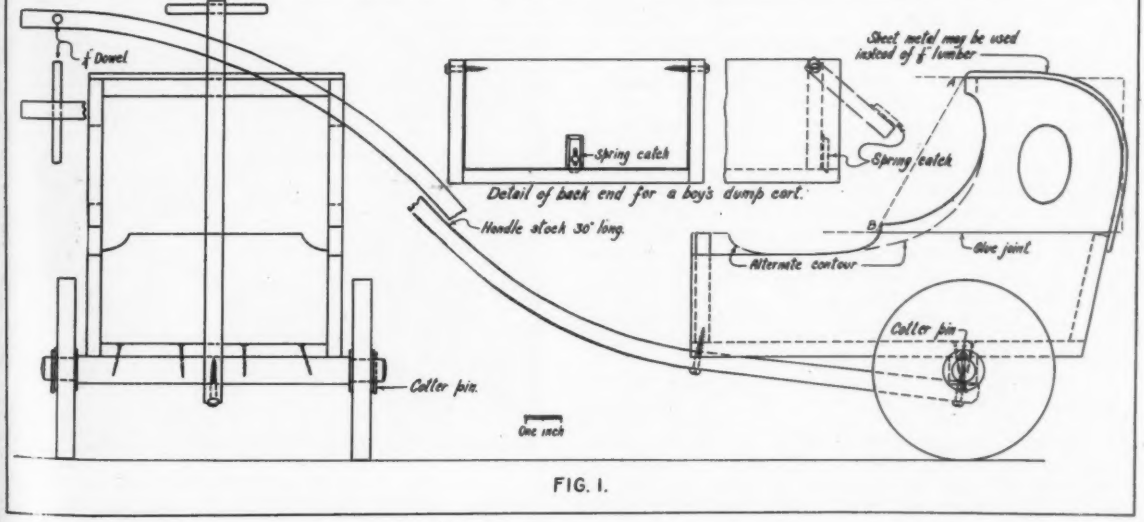


FIG. 1.

UNIV. OF MICH.

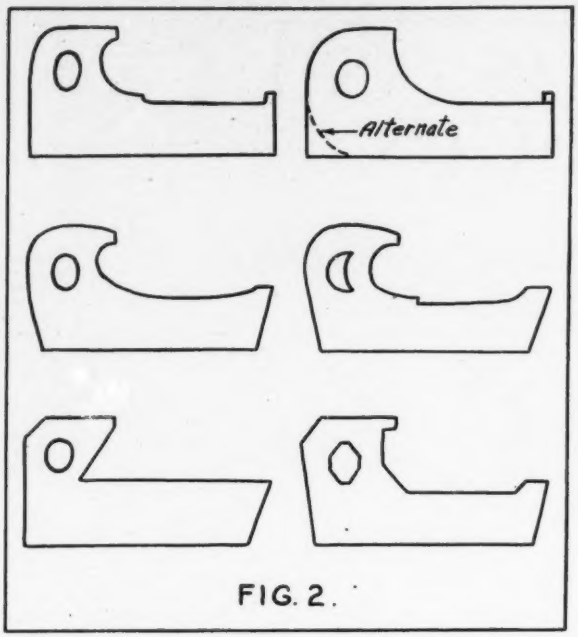


FIG. 2.

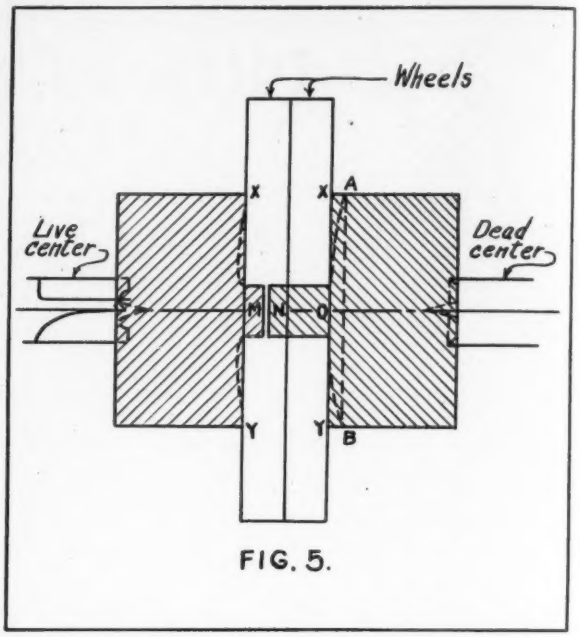


FIG. 5.

lightly and sand smooth. Bore the holes for fastening to the box and also for the ¼-in. dowel crosspiece in the handle. It is important that the handle is well painted to protect it from moisture, if other than waterproof glue is used. The completed handle may be screwed flat to the bottom or it may be bridged from the axle to a notch cut in the bottom at the forward end. The latter method, shown in the drawing, permits the box to assume a more horizontal position.

The axle, and also the wheels, which receive considerable wear, are made from hard maple. The ends of the axle are turned on the lathe to ⅝ in. in diameter, to fit the holes bored in the wheels. It is very important that the lathe centers engage the stock at the exact centers of the ends, or the body of the cart will appear to set at an angle. When finished to size and polished with fine sandpaper, a piece of paraffin wax is held against the turned surfaces while revolving, so as to form a good bearing surface for the wheels. The completed axle is attached to the box with nails and glue. It should be placed at right angles to the sides and well back of center so the rear of the cart will not drag when pulled or pushed, should the handle be held too high.

Remove all mill marks from the wheel stock with a smooth plane and fine sandpaper. Locate the centers of each piece, and with a compass or dividers, draw the circle for cutting to size. Bore the axle holes first, while the stock is square and easily held. This had best be done at a drill press or with the use of a special jig, for the wheels will wobble badly if the holes are not absolutely at right angles to the faces. Bandsaw just outside the sizing circle, to make the wheel stock approximately round and the pieces are ready for the lathe. As screw holes would mar the appearance of the wheels, the stock is turned between centers instead of on a faceplate. A special two-piece spindle is turned to hold the work. (Fig. 5.) Wheels have been turned in the author's class using a spindle 2 in. in diameter, but if many sets of wheels are to be made, arbors of greater diameter are used as they will give longer service and hold the stock more firmly. When turning the two-piece spindle see that the short and long pins M and N are a press fit for the ⅝-in. holes in the wheel stock and that both shoulders XY are square or very slightly concave, but not convex as at AOB.

As the wheels are cut very near size at the band saw, only a light cut with the lathe tools is necessary. The lathe should be run at quite a high speed and the scraping tool, which is the only kind that should be used for turning the wheels, should be fed in very slowly. A big "bite" will catch the wheel stock and hold it still, while the arbor will spin and char the ⅝-in. center pins. After turning, sand the perimeter of the wheels smooth and they are ready for the paint. For this work, they may be handled on some sticks turned or whittled on the end to fit the holes. While drying, hold the sticks in a vise.

Lacquer is used for finishing as it drys quickly and may be had in a variety of colors. Paint the box first, the inside one color, and the outside in some harmonizing hue. The same color used for the inside of the cart may be used on the handle and wheels. On the hooded carts, the color painted on

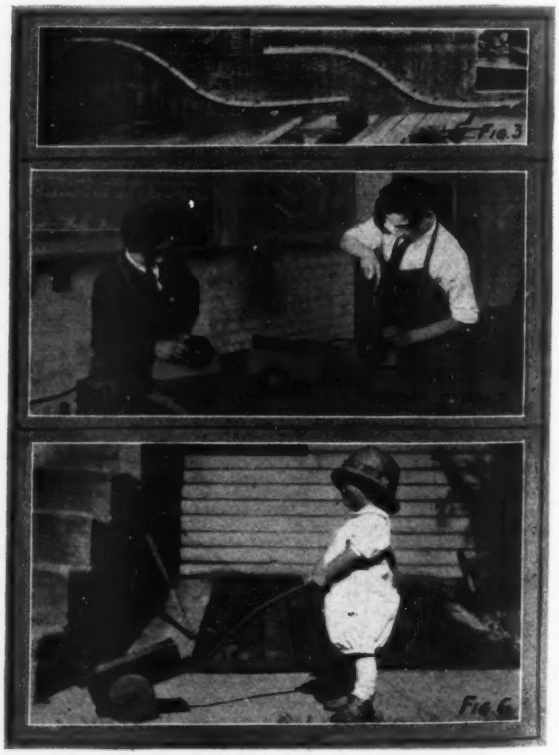


FIG. 3. BENDING THE HANDLES
FIG. 4. ASSEMBLING
FIG. 6. THE DUMP CART IN USE

the inside should also be used on the inner edges of the window opening. Those who are experts at handling a paint brush may paint the front edge of the hood, the inside edge of the windows, the upper edges of the box, and the handle in a third contrasting color. When all the parts are dry they may be assembled.

A FERNERY

Gerald A. Boate, Seattle, Washington

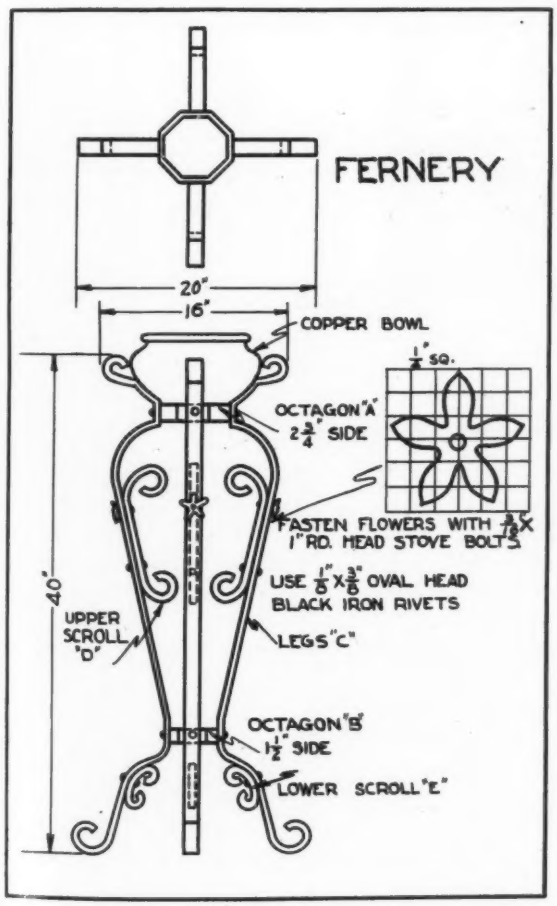
A fern, to grow beautiful, besides being supplied with an abundance of water and plant food, must be placed in a receptacle that is high enough above the floor so that there is ample space between the drooping leaves and the floor. Few better receptacles for holding a fern bowl have been designd than the ornamental iron fernery.

The design illustrated herewith is 40 in. high. Fern bowls may be bought very cheaply, or if metal-working stakes are available they may be made. Emphasis in this article, however, is placed upon the making of the stand.

The first thing necessary in making the fernery shown in Figure 1, is to draw full size, on a wide softwood board about 10 by 44 in., one leg of the stand, the scrolls D and E, and the upper and lower octagons. Each leg is made of a piece of ⅛ by 1 by 66-in. band iron, which may be bent hot or cold to the shape drawn on the board.

List of Materials

1 pc.	⅛ x 1 x 22	Upper Octagon, A	Strap Iron
1 pc.	⅛ x 1 x 12	Lower Octagon, B	Strap Iron
4 pc.	⅛ x 1 x 66	Legs, C	Strap Iron
4 pc.	⅛ x ¾ x 22	Upper Scroll, D	Strap Iron
4 pc.	⅛ x ¾ x 8	Lower Scroll, E	Strap Iron
4 pc.	No. 29 1⅛ x 7¼	Flower	Copper
8 pc.	⅛ x ½	Iron Rivets, Oval Head	
8 pc.	⅛ x ½	Iron Rivets, Oval Head	
12 pc.	3/16 x ½	Stove Bolts, Round Head	



In bending the legs, be sure that the places where A and B are to fit, are flat, and when the leg is held in an upright position, that these surfaces are vertical. Leave all drilling until the last.

The upper and lower octagonal rings are formed by careful bending. The closing angle is to be brazed.

When the legs and scrolls have all been made and matched and the octagonal rings firmly brazed, chalk mark for the center punching of all holes. Be sure that the holes in the legs centered, as shown on the drawing. Care must be taken to be sure that the center punching on the flattened parts of all legs is accurate, so that when the octagonal rings are fastened in place, the upper edges will be horizontal. Do not mark or drill the holes in the upper and lower octagonal rings until all other holes have been drilled in each leg. Use a 3/16-in. twist drill for drilling all holes. Rivet on scrolls where indicated on the drawing. Head up all rivets carefully using a rivet set to protect the oval head. The rivet heads in this project should be placed on the inside of each scroll and leg, and the end which sticks out should be cut off so it projects about ⅛ in. Using the peen end of a 1-lb. machinist's hammer, strike light blows around the circumference of the rivet end until it begins to curl over. Then continue hammering until the riveted end is the same shape as the head. The four 3/16 by ½-in. r.h. stove bolts may now be loosely screwed into the upper holes of scrolls marked D. After these are finally tightened in place, the ends may be riveted over to prevent the nuts from loosening.

The four alternate faces of each octagonal ring may now be chalked so that the holes in the legs may be correctly located on them. If this is done carefully, the pieces when brought together will be in perfect alignment. It may be well to number each leg and each octagonal face, so that if any irregularities in drilling creep in, the result will not be serious, Holes that are not properly located, may be plugged up with a rivet. Fasten each leg to the upper ring with stove bolts.

Make a template of cardboard for the flower, and scribe the shape four times on a strip of 1⅛ by 7¼-in. No. 20 gauge sheet copper. Drill the center holes 3/16 in. Also drill a hole between each petal with a smaller drill, and then trim out the petals of the flower with tin snips. After the copper has been annealed, shape the flowers and fasten them to the legs and scrolls with r.h. stove bolts.

With a little final bending, the four legs are brought to bear evenly on the floor. Then the bowl-holding arms must be bent to fit the bowl which has been selected, the fernery is ready for decoration. Suitable and appropriate decoration requires careful intelligent thought. Study a pansy blossom for color harmony, or an orchid or lily for delicate color blending in tints.

The body color of the fernery may be turquois blue, flecked with gold lacquering powder. The little copper flowers may be made pink with yellow centers. This color scheme, of course, is only suggestive, and may be altered at will, but care should be taken that the beauty of curve and form is enriched and not spoiled by the color which is applied.

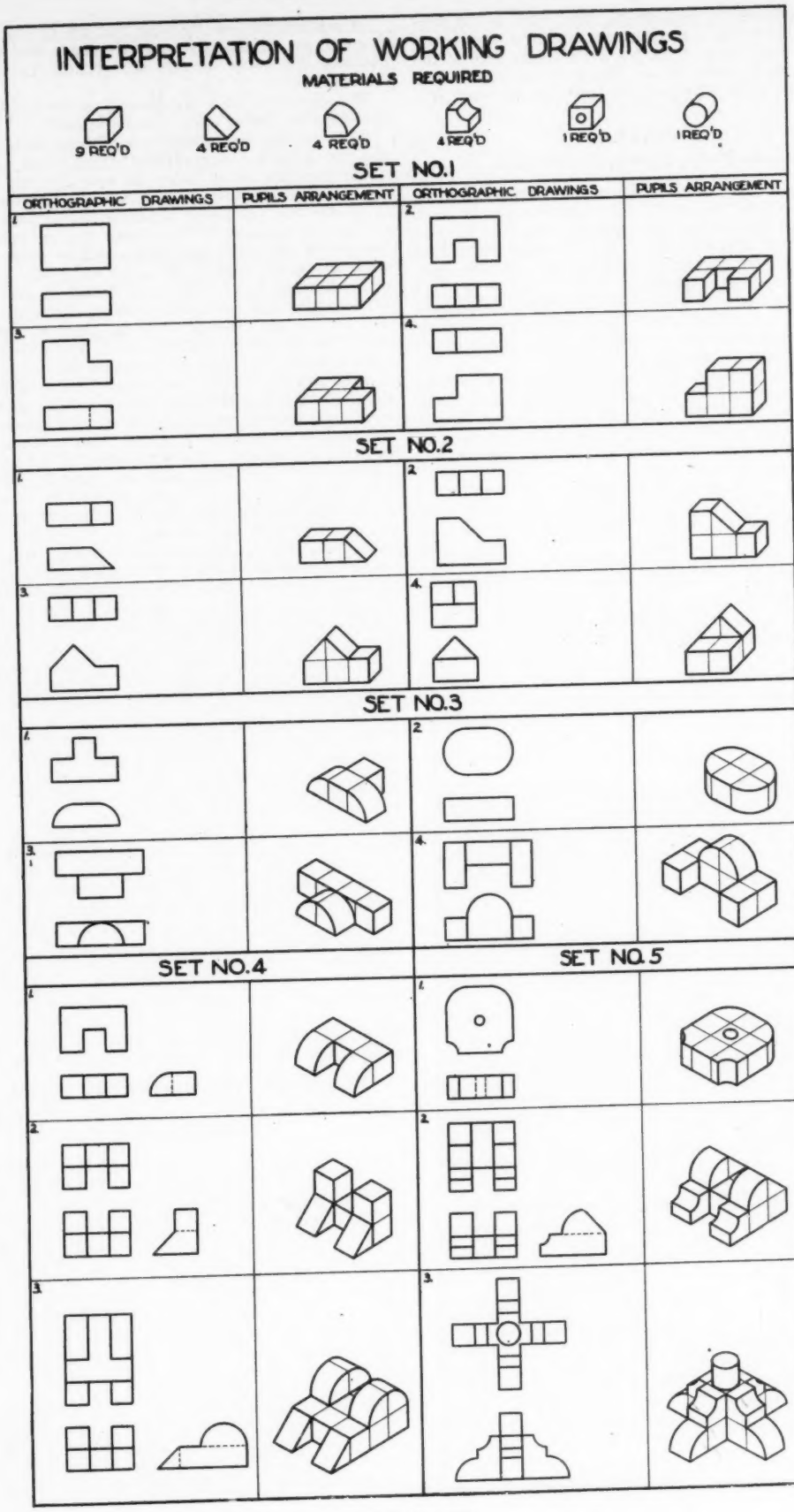
INTERPRETING WORKING DRAWINGS

Kenneth B. Marsh, Lincoln Junior High School, Jamestown, New York

There is a growing conviction on the part of educators that one of the outstanding objectives of the subject of mechanical drawing should be the development of ability to interpret, or read, working drawings. Comparatively few pupils will later in life exercise their ability to produce drawings, but many will be called upon to interpret the drawings of others.

Many teachers have assumed that this ability would be acquired by the study of the subject as ordinarily taught, without special emphasis being placed on the matter of interpretation. These same teachers have, however, discovered pupils in their classes who could produce very creditable drawings, but who failed utterly when they were called upon to interpret an unfamiliar drawing.

The development of this ability needs special emphasis and many plans more or less successful have been tried. The "blue-print" reading lessons, which utilize a series of questions about a drawing, are valuable, but lack in the exercise and development of a pupil's ability to visualize the object as


INTERPRETATION OF WORKING DRAWINGS
MATERIALS REQUIRED
9 REQ'D
4 REQ'D
4 REQ'D
4 REQ'D
1 REQ'D
1 REQ'D
SET NO.1
ORTHOGRAPHIC DRAWINGS
PUPILS ARRANGEMENT
ORTHOGRAPHIC DRAWINGS
PUPILS ARRANGEMENT
SET NO.2
SET NO.3
SET NO.4
SET NO.5

(See Page 473)

Wrestling in the Shop

The shop is not the gymnasium.

Many deaths have been caused by not attending strictly to business while operating machinery.

Practice safety—do not scuffle in the shop.

Safety Series—Earl L. Bedell and George Peacock, Detroit, Mich.

© Industrial-Arts Magazine

HONESTY

Honesty is the best policy.

If I lose mine honor, I lose myself.—
Shakespeare.

I hope I shall always possess firmness and virtue enough to maintain, what I consider the most enviable of all titles, the character of an "Honest man."—George Washington.

Your honesty influences others to be honest.

a whole. The reproducing of working drawings in isometric has been found to be slow and ineffective. Clay modeling has even been resorted to with indifferent success.

The following device which is simple and flexible has been found to be very effective in developing and testing a boy's ability to reproduce in some tangible form objects called for by drawings in orthographic projection. The outfit consists of a series of type solids or blocks of various shapes, usually of uniform size, in order that they may be assembled readily. The pupil is given a two- or three-view working drawing in orthographic projection and is required to assemble the blocks to build up or form the object called for.

The plan has the following advantages:

1. The materials are readily obtainable, clean, and easily handled.
2. Enables the pupil to build up quickly the object called for.
3. Exercises his powers of visualization to the utmost, and tests his knowledge of the drawing.
4. Pupils enjoy the work. It may be utilized as a game.
5. The plan is flexible, almost any number of forms may be evolved by the addition of various shaped blocks.

No attempt has been made in this series to go further than the study of "shape description." The introduction of dimensions is a step which offers a further interesting development.

The drawings shown on page 470 are suggestive only and show but a few of the combinations which are possible. The progressive teacher will evolve many others.

CONTRACT FOR MOLDING

E. W. Manzer, Supervisor of Manual Arts,
Bronxville, New York

The following contract for beginners in molding or foundry work is one that is a very practical aid to the instructor as well as the student. During a demonstration by the instructor there are many things done that escape the eye of the untrained student. This is evidenced by the many questions that are often asked after a good demonstration.

If the student is furnished with a contract, however, he can follow the job better and accomplish the required results with a minimum loss of time. The technical information afforded the student in his reference reading will be assimilated much better if there is more time given him to digest the facts. Then there is the concomitant learning that always comes with the act of doing. Each student will learn better the facts and the tool manipulation, if he has some concrete method of procedure.

The checking up of special parts of the work keeps the instructor well informed with the happenings at the molding bench and at the same time there is time available for him to assist others who are doing some different type of industrial-art activity in the general shop.

A short quiz at the end of each contract is a specific check on the knowledge gained from the reference readings. It is a good way to know how the student is getting the work and also a check on the teaching procedure.

Molding
Contract 5

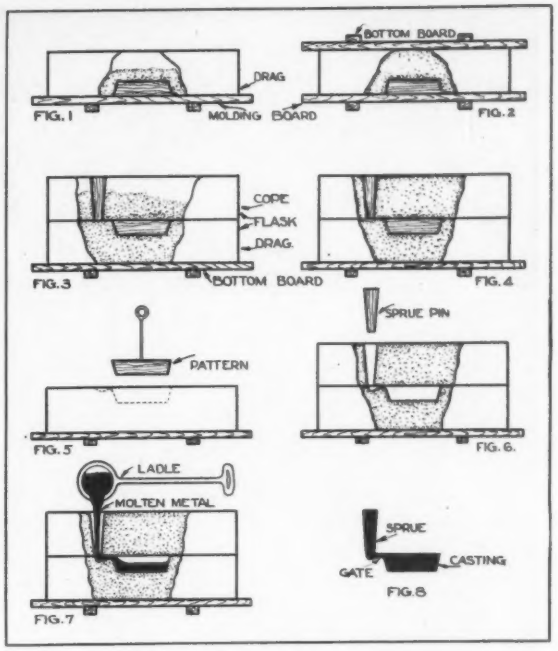
Contract: Molding a one-piece pattern

Specifications: Casting must be free from blow holes, clean cut free from fins and sharp edges.

Tools: Riddle; shovel; follow board; molding board; rammers; spruce pin; flask; straightedge; slick or trowel; bellows; gate cutter; draw spike; swab; ladle.

Procedure:

1. Read references listed below. Get technical information from them.
2. Place the drag on the molding board. How can you tell the drag?
3. Set the pattern on the molding board. Center it. Flat side down. Why?
4. Sprinkle parting sand on pattern. How does this help molding?
5. Riddle tempered sand over the pattern to a depth of about 1 in. (Fig. 1.)
6. Press the riddled sand around the edges of the pattern. Use hand.
7. Shovel the drag heaping full of sand. Peen-ram around the sides of the flask. Then peen around the pattern.
8. Fill the drag full of sand and butt-ram it nearly even with the edge of the drag.
9. Strike off the surplus sand with the straightedge.



10. Scatter fine sand over the drag, and place follow or bottom board over the drag. (Fig. 2.)
11. Clamp the two boards and turn the mold over. Remove the top board.
12. Slick down the sand with the trowel to make a solid parting. Caution.
13. Blow all loose sand from the drag with the bellows.
14. Sprinkle parting sand over the top of the drag.

References: Purfield, Wood Pattern Making, pp. 77–82. Wendt, Foundry Work, pp. 13–33.

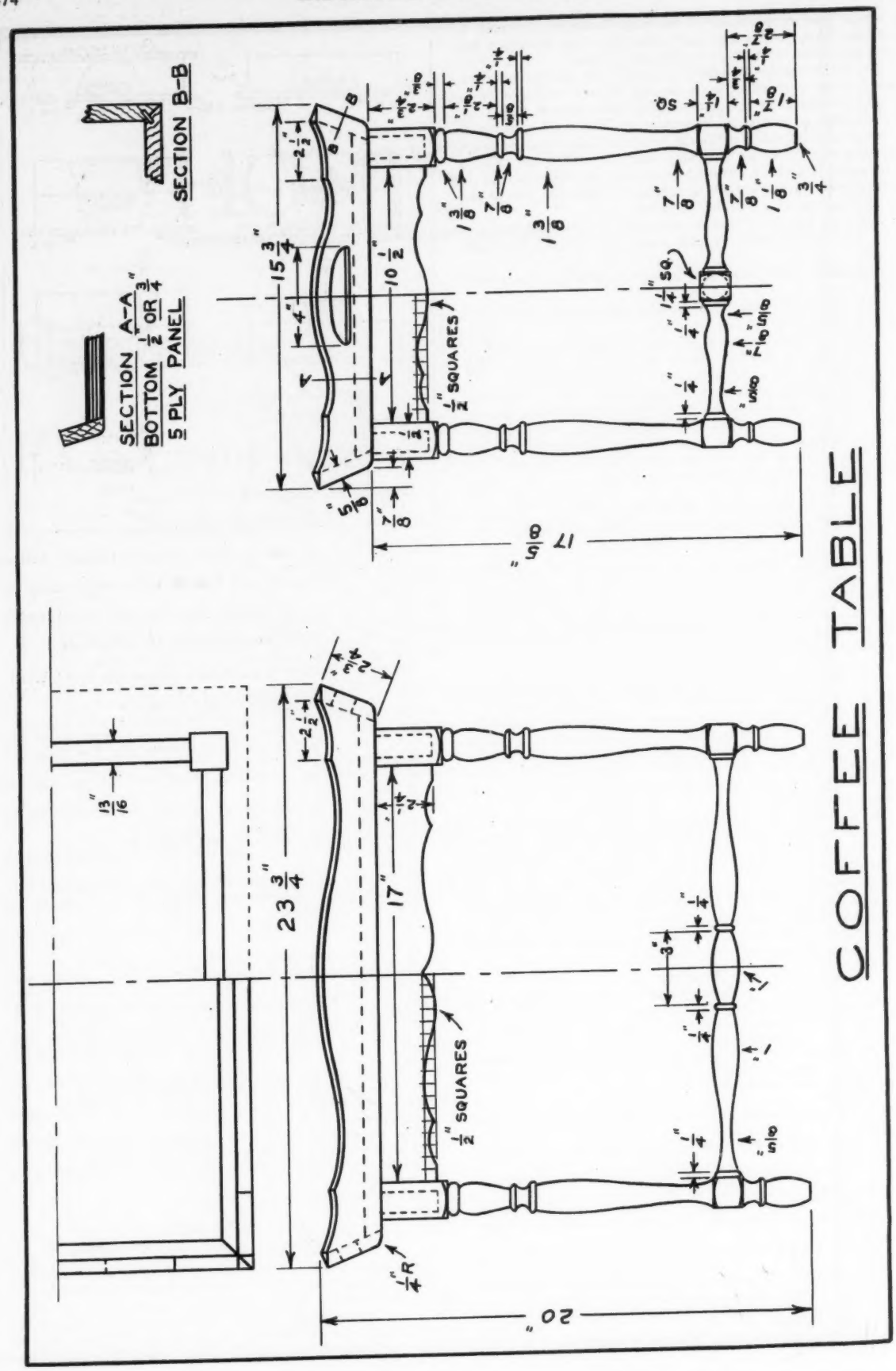
Do not postpone the assigned reading. Do it now.

15. Place the cope on the drag. Do the pins fit into the sockets?
16. Set the sprue pin about 1½ in. from the pattern. Great care must be exercised in setting the sprue pin. Use your best judgment.
17. Riddle sand over the drag to about 1 in. Fill the cope full of sand.
18. Peen-ram around the edge of the cope and then around the sprue pin.
19. Strike off the sand from the top of the cope.
20. Vent the cope with the vent wire. Why is this an important step?
21. Remove the sprue pin with the draw spike. Cut the sprue hole.
22. Pack all loose sand with the fingers. The sand around the hole must not be loose.
23. Lift the cope and set it to one side. This is to be done carefully. Why?
24. Blow off all loose sand from the cope or the drag.
25. Swab the sand next to the pattern with water. Not too wet. Why?
26. Remove the pattern with the draw spike. Rap the pattern before doing so. (Fig. 5.)
27. Replace all sand that breaks off in operation 26. Use the slick.
28. Cut the gate in the drag. How does the gate function in the mold?
29. Place cope on the drag. Use extreme care here. If the sand falls, the operations will have to be done over again.
30. Clamp the mold, or place a weight on top. Is this operation necessary?
31. Pour the metal into the mold through the sprue hole. Be sure to wear a pair of goggles while pouring the metal.
32. Let the metal cool. Take the mold apart and see what result you have.
33. Call instructor for O.K. on work.

COFFEE TABLE

Jos. J. Lukowitz, Milwaukee, Wisconsin

The present great interest in bridge playing has stimulated a demand for a low table on which to keep the coffee, tea, or other refreshments which usually are served after the afternoon or evening bridge game. The accompanying illustration shows a table which fills this requirement. It is low, light in weight, and convenient to carry. Some coffee tables have loose


COFFEE TABLE
SECTION B-B
SECTION A-A
BOTTOM 1/2 OR 3/4
5 PLY PANEL
1/2" SQUARES
17 5/8"
20"
23 3/4"
17"
15 3/4"
10 1/2"
1/4" R

trays. The top of the one illustrated herewith is not loose, but it can easily be made so.

Construction

Before turning the legs and stretchers, it is well to make a full-size layout of them. The wood turner can then more easily reproduce the proper curves. The rails may be joined to the legs by means of mortise-and-tenon joints or by dowels. The frame for the tray requires extremely accurate layout and cutting. For a real high-grade job the mitered corners should be splined and glued. Small blocks of soft wood may be glued on near the ends of the mitered corners to provide a hold for the clamps. A trial assembly should, of course, be made before gluing. The tops of some coffee tables are covered with glass, either clear or colored. A piece of glass may be fitted inside the tray on this table and finished off with a small molding. Most tables of this kind, if not covered with glass or marble, have tops made of beautifully figured woods.

STENCIL DESIGNS

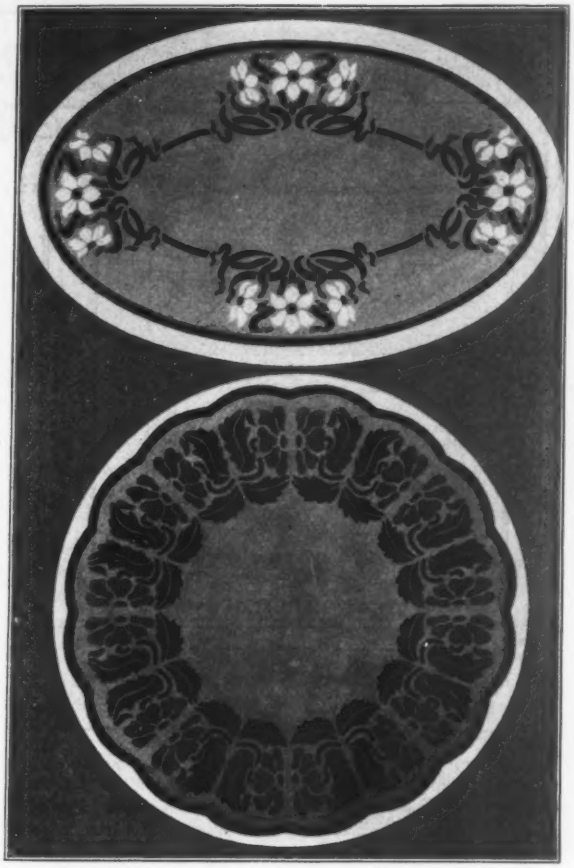
D. Elizabeth Roberts, Philadelphia, Pennsylvania

While the stencil designs herewith were primarily intended for centerpieces, nevertheless the industrial-arts teacher also may find good use for them on table tops, trays, etc. When used on centerpieces, they will be found very useful on small veranda tea tables, or as between-meal pieces for the dining table, or they may serve equally well as tray covers. The designs are very attractive stenciled on in harmonizing colors on a background of light tones of gray or tan. They may also be stenciled on white linen, very delicate colors being used for the design.

Most people who like to work in the handicrafts are familiar with the method of doing stenciling on cloth, but for the benefit of those to whom it is new, a few directions are given here.

First trace the design on stencil paper or on paper prepared by using a thin coating of oil on ordinary cardboard. Then cut out the design with a sharp knife, resting the paper on a wooden block or on glass. Stretch the cloth upon which the stencil is to be used over blotting paper, and fasten it with thumb tacks. Plan the places for the stencil and mark the edges with chalk or basting threads. Then fasten the stencil securely in place with thumb tacks. Either dyes or oil paints may be used for the work. If oil paints are used, mix the colors with turpentine until they are the consistency of cream and add a few drops of stencil medium to set the color. Use separate flat bristle brushes for each color. Brush the color over the stencil, being careful not to have too much color on the brush. Before repeating the design on another part of the material, clean the stencil carefully. When the stenciling is finished, allow the colors to dry for at least 24 hours, and then press with a hot iron, first spreading a damp cloth on the wrong side of the material. This helps to set the color, so that the article may be washable.

The narcissus design for the oval centerpiece makes a very fine appearance when stenciled on a light gray, with the flowers in white or a creamy tone, and the leaves in bluish greens,



CENTERPIECE WITH NARCISSUS DESIGN, ABOVE
DAHLIA DESIGN, BELOW

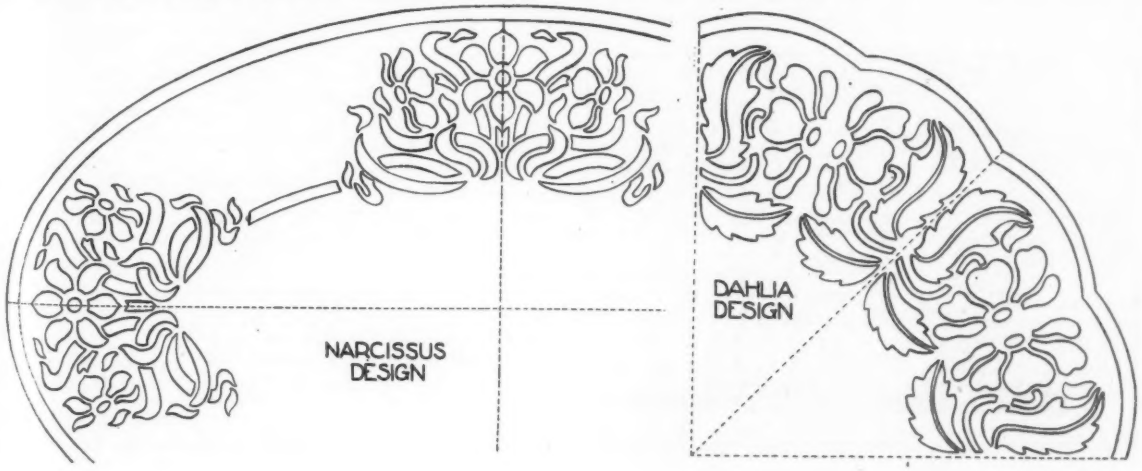
with the connecting lines in the center in a dull shade of blue. The edge should be painted a dull blue.

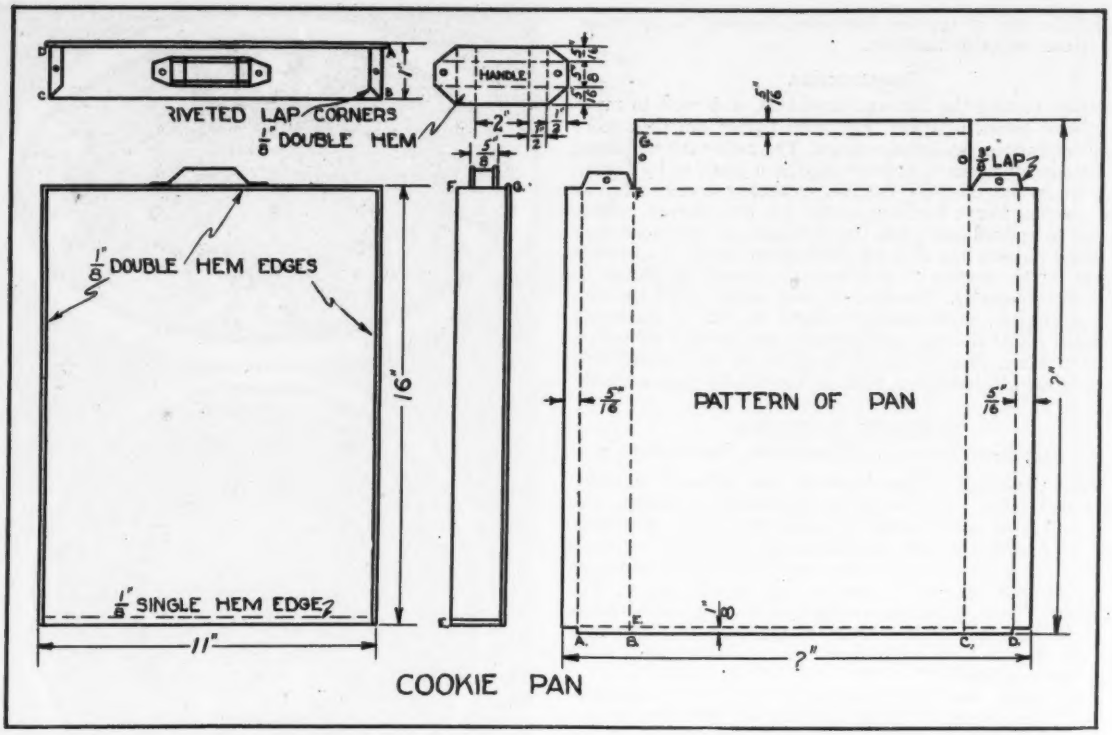
The scalloped dahlia design is quite attractive with the flowers stenciled in rose or violet, leaves in dull greens, and the stems, in a darker green. The scalloped edge should be made in a tone of green which harmonizes with the green of the leaves.

COOKIE PAN

**Edward Stein, Adjustment School No. 50,
Buffalo, New York**

A cookie pan with an open end is one of the sheet-metal projects that the boy asks to repeat on. The reason for the open end is so that the cookies can be removed from the pan without breaking any cookies.





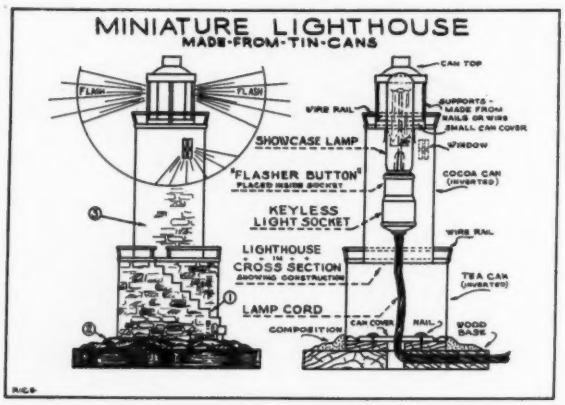
This project covers riveting, making a handle, developing riveted lap corners, and using the bar folder, as the major objectives.

XX charcoal tin plate, or No. 26 gauge black iron are suitable materials for this project.

The pattern of the pan is laid out by taking the measurements for A, B, C, D, E, F, and G from the end plan, and side views. The allowances for the hem edges are taken from the pattern. The laps are then laid out and the pattern cut out.

The double hems and the single hem at the open end are folded on the same side. The sides are folded with the hems on the outside. Fit the laps under the hems and fasten them with rivets.

Make the handle, taking measurements from the drawing of the pattern of handle. Notch the corners and punch rivet holes. Fold the double-hem edges and brake up the handle. Place the center of the handle on the center of the pan. Mark off holes and punch holes using a solid punch. Rivet the handle on. Dress up all edges and corners. A wire edge may be used for this pan, although a double-hem edge will answer the purpose, and will permit the boys to make the project more economical and faster.



A MINIATURE LIGHTHOUSE

Charles M. Rice, North Junior High School, Everett, Washington

A model lighthouse fitted with a "flasher button," is a novelty that may be readily constructed from wood or metal in the school shop. A lighthouse seems to interest both young and old, and models are often used for display purposes.

Using some of the ideas suggested in the illustration shown herewith, models may be carved from wood, turned on the lathe, or patterns may be made for the casting of soft metal into forms that best suit the individual. Other designs, however, may be made of tin cans, as was done with the one shown in the accompanying illustration, and are to be conceived in relation to the primary elements, consisting of the light socket holding the "flasher button," and the showcase lamp. These parts may be purchased at any electrical supply store.

A strip of tin may be bent to form the steps, shown at 1 in the illustration.

The rocks shown at 2, may be formed on the base from a composition such as gesso, prepared clay, casein glue mixed with fine sawdust, etc. If a large can cover is not at hand to serve as a base, wood may be used as shown in the sectional view.

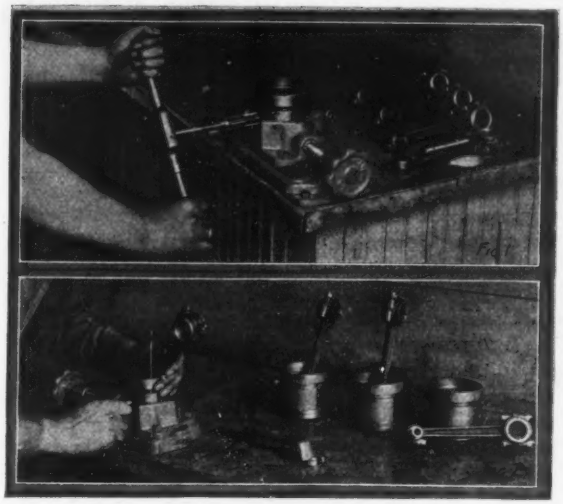
The exterior surface may be finished in a manner to suit the individual. The surface may be finished in a realistic effect by painting in stones, etc., keeping a quiet tone over all. Another method suggested, is to spray part 2 with spots of red and green lacquer, part 1 with patches of red and yellow, part 3 and top of lighthouse with patches of yellow and light-blue lacquer. After the lacquer is dry, a dark crackle lacquer may be sprayed on the surface to produce a decorative effect.

TYPICAL JOB SHEET FOR THE AUTO SHOP

Ray F. Kuns, Cincinnati, Ohio

Reaming the Ford Model T New Piston-Pin Bushings

The Ford Model T piston-pin bushings are machined slightly under size so that they may be line-reamed for the piston pin, after they have been pressed into the piston. The reamer to be used is .740 in. in diameter, and is equipped with a pilot. If the bushings were reamed without a pilot-type reamer, it is almost certain that the holes in the two bushings would not be in proper alignment. Under such circumstances the pin might be a perfect fit in either bushing, but when it



was forced through one bushing into the other, it would bind. This must be avoided since the bearings are in the bushings and the pin must be an exact, although free-turning fit.

Procedure

1. Grasp the piston in the piston vise, as shown in Figure 1. (These piston vises are faced with some soft material such as leather, copper, or babbit, to prevent injury to the piston.)
2. Start the reamer through, seeing that the pilot is engaging in the second bushing as the cutting action starts in the first bushing.

NOTE: The reamer for this work may be secured ground to exact size, having the pilot of a proper diameter to fit the bushings as they come from the Ford dealer.

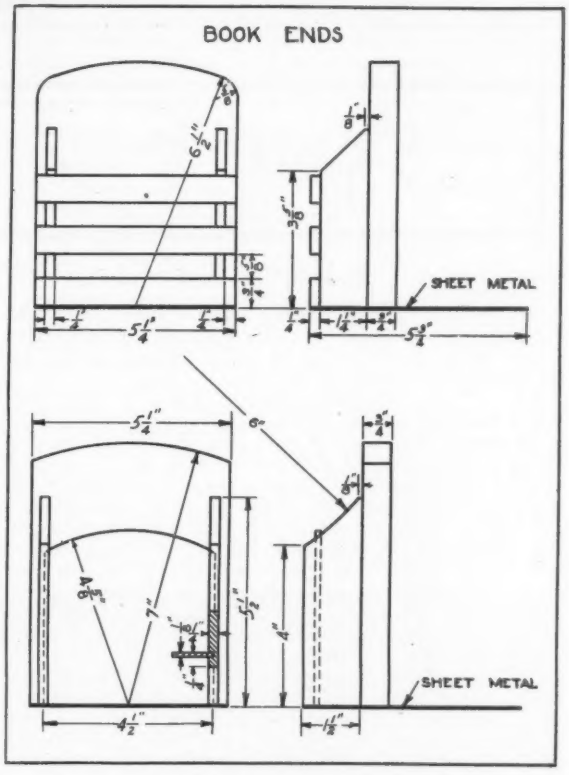
3. Use a steady forward motion when reaming. The mechanic will exert some pressure to force the reamer through as the cutting proceeds. Do not attempt to force the job too much, but keep enough pressure on the reamer to see that it is cutting.
4. If the reamer is sharp and the reamed hole is cut clean and true, it will be possible to push the piston pin through the newly reamed hole by hand, as indicated in Figure 2.
5. Make a preliminary test to see whether the piston pin is going to fit by introducing an end of the pin into each of the piston-pin bushings.
6. Oil the piston pin and the bushing, seeing that there is a light film of oil over their entire surface and that there are no cuttings in the oil.
7. Place the connecting rod in the piston and force the pin through, as shown in Figure 2.
8. Turn the piston pin until the groove in the piston pin lines up with the connecting-rod clamp screw.
9. Install the screw and run it down with a speed wrench.
10. Press the connecting rod to the side so that the upper end of it strikes one of the piston-pin bosses.
11. Inspect the end of the piston pin to see whether it projects beyond the diameter of the piston on that side.
12. If it should be found to project, remove the piston pin and press the bushing into the piston a little bit farther.
13. Check both sides of the piston in this way.
14. When found to be correct by the foregoing test, draw the clamp screw quite tight with the clamp-screw wrench.
15. Insert the cotter key, locking it to prevent the clamp screw from backing out.

BOOK ENDS

Geo. E. Myers, South Junior High School, Everett, Washington

For the boy who does not want to make an expensive project, or who needs a short job to fill in the end of the term, the book ends shown herewith, are suitable. The designs and dimensions given in the drawing are merely suggestive and may readily be changed to suit the scraps of material left from some larger project. If a piece of heavy-gauge aluminum is used on the bottom of the book ends, it will appear

better than sheet iron. A piece of felt should be glued to the bottom side of the metal to prevent marring any furniture it may rest on. The slats may be ripped from dressed stock with a smooth-cutting saw and squared in a miter box. They will look best if they are fastened on with brass escutcheon pins.



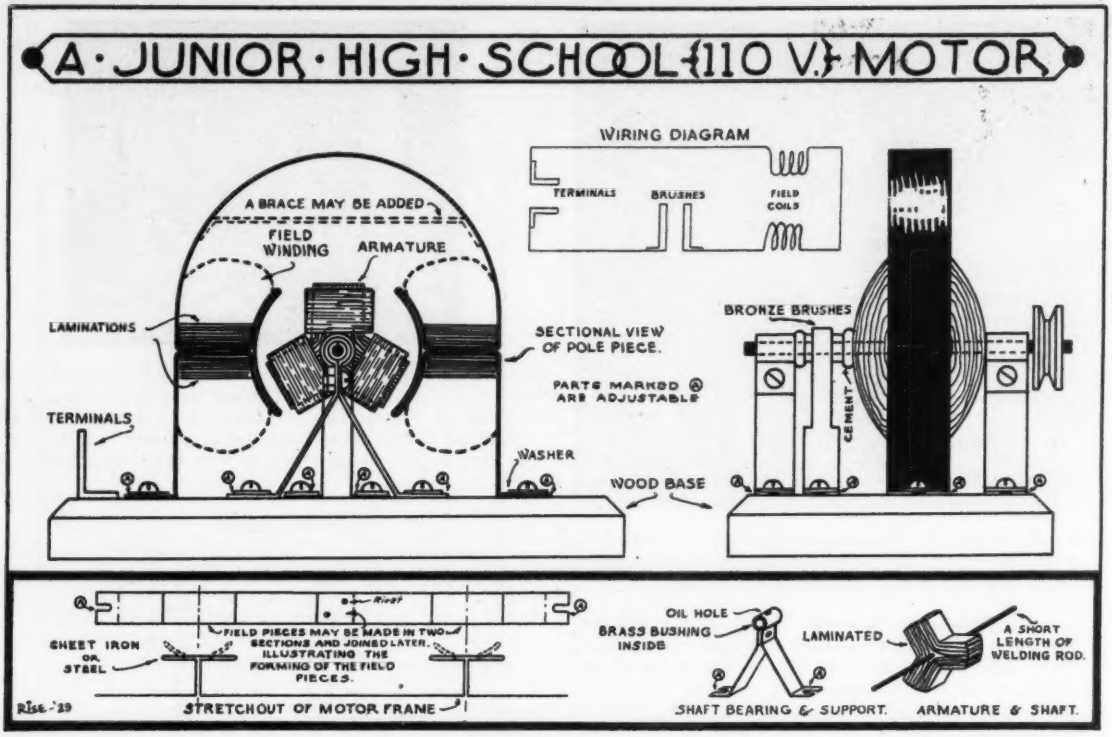
A JUNIOR-HIGH-SCHOOL MOTOR

Charles Rice and E. T. Williams, North Junior High School, Everett, Washington

After writing the article entitled "A Three-Pole Armature for Toy Motors," which appeared on page 393 of the October, 1929, issue of the INDUSTRIAL-ARTS MAGAZINE, a few ideas came to me that suggested a simple method for forming a field for that armature, as well as a method for supporting the ends of the motor shaft. These were sketched on paper and turned over to Mr. Williams, who tried them out with his students in the electrical shop.

Motors that have been illustrated in the past for high-school or junior-high-school construction, require expensive machinery or an intricate "set up" for making the laminations of the armature and field. Most of the work must be done by especially trained students or those adept at setting and operating the machinery required for doing the work.

The electric motor described herewith, requires not over seven of the most common tools in its construction; tin snips,



hammer, vise, hack saw, hand drill, emery wheel or file, and a soldering iron.

The speed of the North Junior motor is over 2,000 r.p.m., but it may be controlled by a simple rheostat. This motor is wound to run directly from the 110-volt house current, but the usual 6-volt motors also are made.

Armature Construction

The armature laminations are rectangular pieces of No. 24 gauge silicon steel, but any sheet iron or steel will do, providing it can be bent. A common size is $\frac{7}{8}$ in. by $2\frac{1}{4}$ in. A total of 52 pieces are cut. These are bent to an angle of 120 degrees and placed in three groups of 17 pieces each about a 5- or 6-in. length of welding rod, which serves as the shaft. The laminations are temporarily held in place by a piece of wire. A half dozen turns to each pole will do, but any more turns may cause heat, acting the same as a shorted secondary coil.

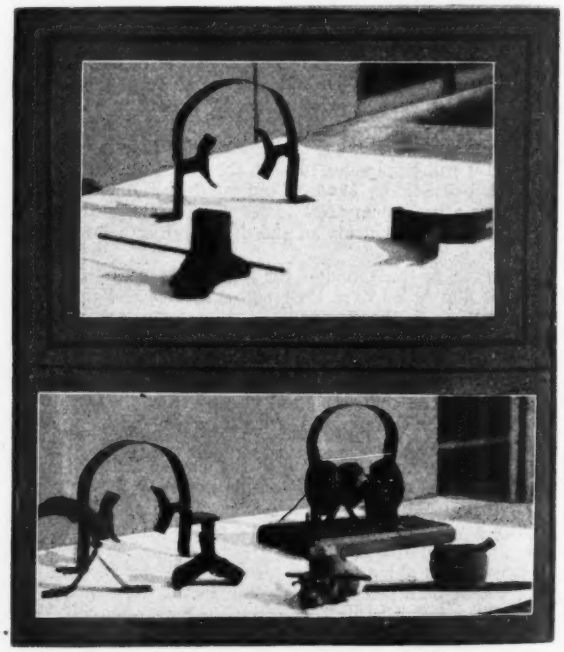
The armature laminations should be well centered on the shaft before removing from the vise where they have been placed for the wiring operation. The ends of the poles are next trued up on an emery wheel or by using a file or hack saw. Each pole must be of equal length and weight. A little solder, or retort cement added to a pole, will help to balance the armature. Retort cement or solder will also hold the armature to the shaft in case the parts are inclined to be loose. The armature is next insulated with friction tape or empire cloth, and wound with insulated wire. From 250 to 300 turns are used on each pole. Each pole is wound in the same direction.

The Commutator

The commutator is simply a $\frac{5}{8}$-in. length of $\frac{3}{8}$-in. brass tubing cut lengthwise into three equal parts. These segments are fastened to the shaft with retort cement which also serves as an insulator. The cement must be given time to dry, otherwise its moisture content will have a tendency to short. A small band of retort cement is placed around the segments, at each end of the commutator, to keep them in place. This, however, is not done to the inside end until the leads from the armature windings have been soldered in place.

The Field

The field is made as follows: A strip of No. 20-gauge iron or steel is shaped in a vise with a hammer so as to serve for the framework. The strip is $\frac{7}{8}$ in. wide and about 14 in. long, and may be trimmed later. To this frame, 30 or 40 pieces of sheet iron or steel are added to increase the magnetic strength



and to cut down heat. After these laminations are fitted in snugly, they are insulated with friction tape or empire cloth. Each pole is then wound with No. 30 or 31 insulated wire. Six hundred turns of No. 30 or 700 turns of 31 are sufficient.

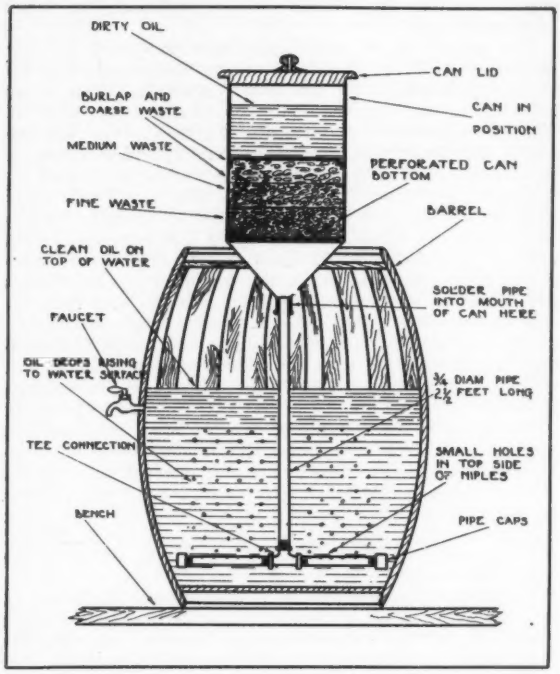
Bearing and Supports

The bearing is made of a piece of $\frac{3}{8}$-in. brass tubing which has been sawed through one side with a hack saw, thus allowing it to be formed to the size of the motor shaft. The bearing is held firmly in place with a short machine screw, as illustrated. Wherever the parts are fastened to the base with screws it is to be noted that the parts are slotted to allow for adjustment.

RECLAIMING USED MOTOR OILS

L. M. Jordan, Donalsonville, Georgia

Much lubricating oil which is drawn from gasoline motor crankcases could be filtered and then would be suitable for lubricating the less delicate bearings of farm machinery. In the accompanying illustration, a handy contrivance for filtering such oil is shown.



OIL FILTER

Cut the bottom smoothly out of a 5-gal. conical-top oil can. Perforate this bottom like a sieve, and fasten it into the inverted can so that it rests on the shoulder of the conical top, as shown in the illustration.

Solder a piece of ¾-in. pipe 30 in. long, which is threaded at one end, into the mouth of the oil can. The crosspiece which is to be screwed on to the lower end of this pipe, consists of a ¾-in. pipe, and two caps. Assemble the crosspiece and drill a row of small holes into the upper side of the two pieces of pipe which form it.

Cut a 5-in. diameter hole with a keyhole saw in the center of one of the heads of an ordinary 50-gal. wood barrel. Pass the crosspiece through this hole into the barrel and then screw into it the pipe which is soldered into the oil can. Then lower the entire assembly into the barrel until the outer surface of the conical can top rests on the edges of the holes in the barrel head.

If everything has been made correctly, the piping which makes up the crosspiece, will be a few inches above the lower barrel head. Now place a layer of fine waste on the perforated bottom of the oil can. Over this, place a layer of medium waste and then cover this with another layer of coarser waste. Over the top of the latter, place a piece of burlap and tuck its edges down around the waste. Next pour clean water into the barrel until it is half full. The filter is then ready for use.

Pour the old oil into the upper can. This will seep through the three layers of waste, pass down through the vertical pipe, and then come out through the small holes which have been drilled into the short pipes making up the crosspiece. These drops of oil rise to the surface where the oil, now cleansed of its impurities, accumulates. A faucet placed as shown in the illustration permits this clean oil to be drawn off. A wood lid should be made to fit over the top of the tank.

After the waste in the filter has become thoroughly fouled, it may be replaced.

METHOD OF TRANSFERRING DESIGNS ON WOOD

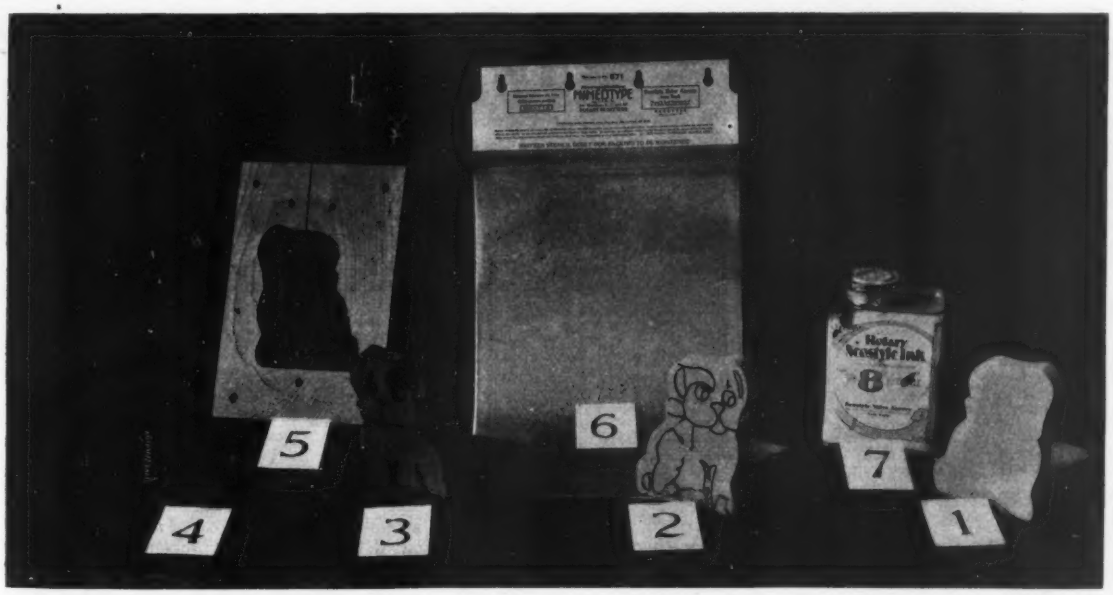
Geo. A. Phillips, East Hampton, Massachussetts

The work of the classes in the continuation school in East Hampton, Mass., embraces a wide range of projects including cabinets, smoking stands, tilt-top tables, magazine troughs, umbrella racks, typewriter tables, and other projects, all of which are made in quantities on the factory basis.

As a sort of side issue or relaxation from the more serious phase of the work and at the same time to make a practical use of some of the waste material, the boys have been turning out a unique little doorstop in the form of a bull dog which sits neatly against the open door as if it were guarding the entrance or greeting the visitor.

The modus operandi by which these little fellows are produced is quite ordinary up to the point where the design is transferred from the stencil frame to the object.

The first operation is to make the wedge-shaped piece which fits under the door and then the form of the dog is cut from any scrap pieces of ⅝-in. wood. Next, the wedge



TRANSFERRING DESIGNS ON WOOD

and the dog are fastened together with nails and glue. The whole article is then sandpapered and lacquered with two coats of some base color and allowed to dry two days. Next comes the design.

In order that the design would be uniform, we developed a plan of printing by which the outlines are clearly marked on each block with a high degree of accuracy and with speed. This is done as follows:

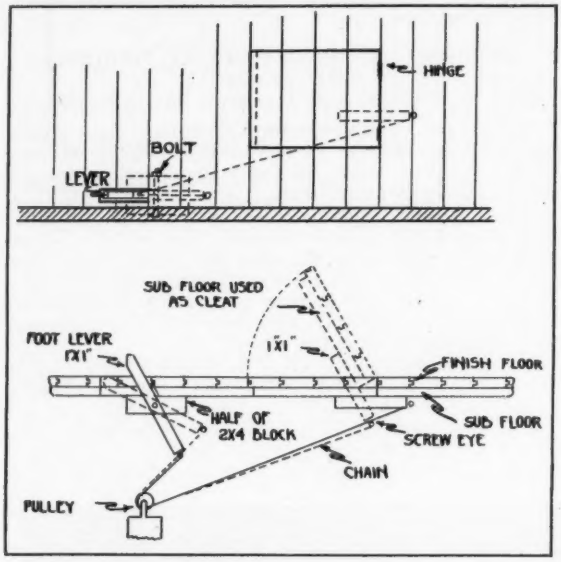
The piece of felt (4) is soaked with Neostyle ink (7). It is then laid on a piece of 3-ply panel and covered with a mimeotype stencil sheet (6) on which the design has been drawn with a stylus. Over this is then fastened a piece of 3-ply panel (5) out of which the outline of the dog has been cut.

The blank block (1) is then set into the outline and pressed down firmly upon the stencil (5), thus transferring the lines of the design to the figure (2) which is then ready to be painted by hand, as shown at (3).

A HOME PROBLEM

Howard W. Boekeloo, Kalamazoo, Michigan

It is often said that the labor-saving machines were invented by the lazy man. If that is true, the cognomen may be applied to the author, because he made this device in an attempt to substitute gravity for the labor of emptying the waste-paper basket.



The drawing practically explains itself, but a few suggestions as to its use may make it clearer. The foot-operated trapdoor is best located at the edge of the kitchen over the coal bin, or a basket may be hung beneath it. Sweepings, tin cans, or other discarded materials may be deposited, even though the operator's hands may be full, by a light touch of the foot which flips up the door. The action of this lever is shown by dotted lines.

This may make a practical project for a class in household mechanics, and a model to small scale may be easily built for class demonstration.

THE BOSTON VOCATIONAL SOCIETY HOLDS MEETING

A large number turned out for the first meeting of the Boston Vocational Education Society, which was held on Saturday, October 5, at Wentworth Institute, Boston, Mass.

Through the courtesy of Mr. F. E. Dodds, the director of the Institute, small groups of members, accompanied by guides, were shown through the workshops and laboratories of the school. After touring the shops, the groups adjourned to the school cafeteria, where a luncheon was served. At the completion of the luncheon, a business meeting was held in the assembly hall. The reports of the secretary and treasurer were read and accepted. Mr. Babb, the retiring president, reviewed the activities of the society during the year, and then turned over the office to the new president, Mr. James T. Gearon.

The schoolmen in attendance were welcomed by Mr. Mickelson, head of the patternmaking department, who addressed the members. Mr. Mickelson traced the history of the school from the machine shop and power house of 1911, through its growth to its present-day size. In 1921, the suggestion was made that the school should extend its course to three years, making it an engineering course, but it had adhered to its policy of short courses of one and two years. Had the change taken place, it might have become a fourth-rate engineering school, whereas today it is a leader in short courses. In general, two types of courses are offered: First, a one-year course of apprenticeship grade for persons desiring to become skilled workmen; second, a longer and more extensive course for those who have had some practical experience or training, and who wish to become skilled workmen, master mechanics, or foremen. The plan of instruction requires each student to spend a part of each day in the shop, acquiring practical experience and skill. The remainder of the day is spent in the laboratory, drawing room, or classroom, where the student is given instruction to supplement the shop-work. The instruction includes talks on shop methods, applied science, applied mechanics, electricity, chemistry, English, drawing, and mathematics. A number of evening courses are offered, covering carpentry, masonry, electric wiring, forging, patternmaking, foundry practice, machine-shop work, printing and engraving.

Mr. Gearon, the new president, who spoke to the members, said that the executive committee has decided to try out a change in the time of the meetings. Formerly, the members have met for luncheon, but for the next three meetings, they will meet on Saturday evening for dinner, with the address to follow.

After a rising vote of thanks to Mr. Mickelson and the faculty of Wentworth Institute for their hospitality, the meeting adjourned.

The following officers and committees were elected:

President, Mr. James T. Gearon, Everett, Mass.; vice-president, Mr. Willis C. Brown, Arlington, Mass.; secretary, Mr. Harold R. Wise, Boston, Mass.; treasurer, Mr. Louis A. Van Ham, Roslindale, Mass.; librarian, Mr. Forest L. Mason, Quincy, Mass.

The Committees: Program, Mr. Arthur H. Kipp, West Roxbury, Mass.; Education, Mr. Herbert Blair, Newtonville, Mass.; Membership, Mr. Edward C. Emerson, Boston, Mass.; Social, Mr. Leslie J. Nutting, Beverly, Mass.; Press, Mr. Charles F. Rothera, Quincy, Mass.; Positions, Mr. Andrew C. Hanson, Lynn, Mass.—*Chas. F. Rothera and Louis Van Ham.*

THE ANNUAL MEETING OF THE ILLINOIS SOCIETY

The fourth annual convention of the Illinois Society for Vocational and Practical-Arts Education was held at Chicago, Ill., on November 1 and 2. The officers of this organization are to be complimented on the value of the entire program.

The meetings were uniformly well attended, even those on Saturday afternoon, although there were some good football games scheduled which the visiting teachers might have attended.

At the general session held Friday afternoon, Dr. R. L. Cooley, director of the Milwaukee Vocational School and president of the American Vocational Association, gave an unusually convincing talk on a subject which he entitled "The Bunk Pile and the Junk Pile." His address may be summarized as follows:

The solution of our present-day problems must come out of sociological, rather than engineering studies. It is often said that machinery will kill humanity, but this will never happen if the business and industrial magnates will only see

that their success is tied up with the development of the underprivileged.

At a time when the 5 day per week is argued in order that more people may find jobs, it is surely not too much to ask for 1 day per week to be turned over to the education of the millions under 18 whose educational opportunities are otherwise cut off entirely. The potentiality of these young people for good is great, but their potentiality for evil is terrifying, just as nitrogen is beneficial in fertilizer and destructive in TNT. Education is the magic lamp which lights the way for big business.

Mr. Albert G. Bauersfeld, director of Technical Work in High Schools, Chicago, spoke on "The Relationship of Manual-Arts Courses in Junior and Senior High School." He showed that the set-up in both schools required considerable reorganization, in order to make them function properly, each in its own sphere. His studies show that the junior high school has a tendency to keep students in school for at least one additional year, and that for that reason it was worthwhile to study the problem thoroughly, and to assist the teacher in the junior high with as much organized material as can be developed.

Mr. Robert E. Downs, director of education, Cook county, chose as his subject "Life is That Way." In a very able way, he pointed out that probably the teacher was unduly emphasizing the professions in his vocational-guidance work with the students. It is very much better, he stated, to instill a philosophy of life rather than a great ambition. He said that America is professionally top heavy, and that probably we, the teachers, are the fault of it.

The annual banquet was a thoroughly enjoyable affair. Mr. Wm. J. Bogan, superintendent of schools, Chicago, acted as toastmaster in his usual able manner. The speakers on this occasion were Mrs. Benjamin F. Langworthy, Woman's City Club, Chicago, the Hon. Perry W. Reeves, member of the Federal Board for Vocational Education, representing industry and labor, Washington, D. C., and the Hon. Frank O. Lowden, former governor of Illinois.

At the annual business meeting held Saturday morning, an amendment was adopted changing the name of the organization from the Illinois Society for Vocational and Practical-Arts Education to Illinois Vocational Association.

The following officers were elected for the coming year: President, William J. Bogan, superintendent of schools, Chicago; secretary, Urban G. Willis, Principal, Pullman School, Chicago; treasurer, N. F. Fultz, director of vocational education, Morton Township High School, Cicero; vice-presidents, Edward J. Tobin, superintendent of schools, Cook county; Mary E. Freeman, Chicago Normal College; Mary C. Scovel, Chicago Art Institute; L. P. Elliott, director of industrial education, Peoria; S. B. Irish, Evanston Township High School; Nellie Ryan, principal of North Side Continuation School, Chicago; and Lila McNutt, LaSalle-Peru Township High School, LaSalle.

Mr. Albert F. Siepert, dean, Bradley Polytechnic Institute, Peoria, and Mr. C. C. Willard, principal, Phillips Senior High School, Chicago, were elected to the board of directors.

At the general meeting following the business meeting, Hon. Rodney H. Brandon, director, State of Illinois Department of Public Welfare, Springfield, made an earnest plea for universal individual education, thoroughly socialized by vocational guidance. He expressed the opinion that only in this way could crime correction be changed to crime prevention. His experience in prison work shows that school lapsation was the cause for the continued increase in prison population, and he expressed the opinion that school lapsation was caused by our present neglect to fit the education to the need of the individual student.

Dr. William T. Bawden, managing editor, the Manual Arts Press, Peoria, in his talk on "Some New Problems confronting the Shop Teacher" pointed out the following:

1. The enrollment per teacher in shop classes is on the increase. The work must be organized to take care of this increase.

2. Present tendency shows that greater variety must be offered in the shops. The general shop is here to stay and the teacher should prepare himself to teach it.

3. The books and texts which are helpful in the shop are on the increase, and the teacher must keep abreast of this literature.

4. Larger classes will make an errand boy out of the teacher, rather than an instructor, if the teacher does not organize his work properly.

5. The subject of tests and measurements should be studied so that testing in the shop will be done efficiently and properly.

6. The educational requirements for teaching positions are being consistently raised throughout the country. Some states already insist on the bachelor of science degree for shop teachers. This must not be overlooked by the teacher who is preparing for teaching shop subjects.

7. Promotion for the shop teacher depends on his professional training. The shop teacher who has aspirations for promotion into the administrative field, should recognize the fact that special preparation is needed for positions of this kind.

8. The shop teacher should not overlook the fact that while his main duty may be the teaching of his particular subject, yet he must also be able to sell his subject to the public.

The speakers at the sectional meetings were as well chosen as for the general meetings, and the retiring officers, especially Mr. Albert F. Siepert, who, as president, was held responsible for the success of the convention, are to be congratulated upon their thorough work.

TENTATIVE PROGRAM FOR THE AMERICAN VOCATIONAL ASSOCIATION

The annual meeting of the American Vocational Association will be held December 5–7, at New Orleans, La. The meetings will be held in the Tip Top Inn, the Roosevelt Hotel, and the Delgado Trade School.

The topic for discussion at the opening session will be "Examples of Vocational Training for Industry." At the second session, the topic will be "Plant Training for Industry and Evening Industrial Schools," with Mr. J. C. Mahoney, of Dallas, Tex., Mr. R. W. Selvidge, of Columbia, Mo., Mr. L. W. Fox, of San Antonio, Tex., Mr. H. C. Givens, of Bemis, Tenn., and Mr. H. G. Martin, of New Orleans, as speakers.

At the Friday session, the general topic for discussion will be "Apprenticeship Training in Industry," with Mr. C. G. Via, of Newport News, Va., Mr. Henry Roesch, of Chicago, Mr. L. E. Brigham, of Portland, Oreg., Mr. O. D. Adams, of Salem, Oreg., Mr. Victor Smith, of El Paso, Tex., Mr. P. L. Cressman, of Harrisburg, Pa., Mr. R. O. Small, of Boston, Mass., and Mr. Miguel Carrasco, of El Paso, Tex., as the speakers.

On Saturday, the topic for discussion will be "Industrial Education in States with No Industrial Centers," with Mr. W. F. Bond, of Jackson, Miss., Mr. E. F. Riley, of Wahpeton, N. Dak., Miss Marcia Gibbs, of Jackson, Miss., and Mr. George Hambrecht, of Madison, Wis., as the speakers.

At the printing session, Mr. Fred J. Hartman, of Washington, D. C., will be in charge. Mr. Charles W. Sylvester, of Baltimore, Md., will talk on "A Survey of Printing Educa-

tion"; Mr. F. H. Wing, of Buffalo, N. Y., will discuss "Printing in Public Schools"; Mr. T. E. Dunwody, of Tennessee, will talk on "The Training of Pressmen"; and Mr. William Pfaff, of New Orleans, will take the subject, "Printing, Big Business." Other addresses include "Printing, a State Program," by Mr. E. L. Bowman, of Hartford, Conn.; "Training Program for Apprentices," by Mr. E. G. Ingraham, of Kingsport, Tenn.; "Trade Tests in Printing," by Mr. E. E. Sheldon, of Chicago, Ill.; and "A Dream Come True," by Mr. E. P. Mickel, of Nashville, Tenn.

At the session for trade-school principals, Miss Elizabeth M. Fish, of Minneapolis, Minn., will discuss the topic, "Problems of the Small Trade School for Girls"; Mr. O. H. Turner, of St. Louis, Mo., will talk on, "Productive Work in Trade Schools"; Mr. Arthur B. Mays, of Urbana, Ill., will take up the subject, "Making a Teacher of a Mechanic"; and Mr. W. B. Kamprath will discuss "Securing Community Cooperation and Support for a Public Trade School."

At the session on teacher training, the topic will be "In-Service Training of Evening-School Teachers." The speakers will be Mr. Hartman Dignowity, of Austin, Tex., Mr. George Sanders, of Phoenix, Ariz., Dr. Walter B. Jones, of Pittsburgh, Pa., and Mr. A. S. Hurrell, of State College, Pa. Other topics will include: "The Survey as a Means of Training Teachers," by Mr. Clyde H. Wilson, of Knoxville, Tenn.; "The Need of Standardizing Teacher-Training Courses," by George E. Myers, University of Michigan, Ann Arbor; "The Training of Vocational Teachers in the Colorado Agricultural College;" and "Problems Requiring Study in the Field of Teacher Training."

The session on part-time education will take up the topic, "Recent Research and Experiment in Continuation Education." Talks will be given on "The Personnel of Continuation Schools," on "Instructional Material for Continuation Schools," and on "Cooperative Part-time Education."

There will also be sessions on vocational guidance, and on commercial education.

DECORATORS' CONFERENCE AT MEETING OF AMERICAN VOCATIONAL ASSOCIATION

The decorating instructors will hold a conference in connection with the meeting of the American Vocational Association, to be held December 5–7, at New Orleans, La. Mr. Harry Moses, New Orleans master painter, will make the address of welcome. Mr. L. P. Lindelof will talk on "Viewpoints from the Trade"; Dr. Gerald Whitney, of Pittsburgh, will discuss "Instructional Materials in the Decorating Trades"; Miss Julia Grady, of Madison, Wis., will talk on "Harmonizing Wall Coverings with Furnishings"; Mr. M. P. Christensen, of Dallas, Tex., will discuss "Problems of Evening-School Instruction; and Mr. A. L. Clark, of Chicago, Ill., will take for his subject, "A Workable Plan for Apprenticeship Training."

A demonstration of paper-hanging instruction will be given at the Delgado Trade School.

HOLD JOINT MEETING OF NORTHEASTERN OKLAHOMA TEACHERS WITH TULSA CLUB

The Northeastern Oklahoma Industrial-Arts Teachers joined with the Tulsa Manual-Arts Club at its regular monthly meeting, held on Friday, October 25, at the Y.M.C.A. building.

Mr. F. C. McCullough, president of the club, presented an interesting program. Mr. C. O. Paul, of Muskogee, gave a talk on "Character Construction as an Aim in the Manual-Arts Program"; Mr. Roy Ludlow discussed the topic, "Teaching for Retention"; and Mr. M. E. Franklin, of Tahlequah, presented a suggestion for the compilation of a manual-arts directory of the state for use by the members. Mr. H. F. Rusch, of Oklahoma City, commented on the large number in attendance and the interest shown in all subjects relating to their work.

INDUSTRIAL-ARTS TEACHERS OF NORTHEASTERN OKLAHOMA MEET

The annual meeting of the Northeastern Oklahoma Industrial-Arts Teachers was held October 24–26, at Tulsa, with an attendance of more than sixty persons. Mr. O. B. Badger acted as chairman of the meeting.

Mr. H. F. Rusch, of Oklahoma City, spoke on the topic, "Why Have a Manual-Arts Supervisor." A number of sectional meetings also were held for teachers of drawing, woodworking, metal work, electricity, and printing.

The following officers were elected:

President, Mr. W. W. Graham, Tulsa; vice-president, Mr. Paul Wheeler, Bartlesville; secretary-treasurer, Mr. C. O. Husted, Sand Springs.

It was decided to hold the 1930 meeting at Muskogee.

(Continued on Page 28a)

A.V.A. PRESIDENT'S INVITATION TO THE READERS OF THE INDUSTRIAL-ARTS MAGAZINE, 1929

Again through the columns of the INDUSTRIAL-ARTS MAGAZINE, I am happy to address the members of the American Vocational Association. It is a pleasant job, but not an easy one, to be president of your organization.

The achievement that looms up in the near past is the federal legislation, piloted to a successful conclusion, which has brought substantial aid to the fields of agricultural and homemaking training.

The work immediately ahead and in which we are at present engaged, is to bring corresponding aid to the field of trade and industry. I think it is not too much to say, in addressing ourselves to the purely selfish instincts of our membership, that the work of our vocational associations, national and local, has opened up a big, new field of service that has given thousands of people employment, good pay, reasonable conditions under which to work, and has greatly increased the chances of employment.

Thousands of the rank and file of our membership have been directly and personally benefited through the organization. They may feel that they have obtained their positions purely upon their own merit; but their merit could have been as great as it is, and without the work of such organizations as ours, neither the public sentiment and understanding, nor the legal basis would have resulted in their employment, or in our work being undertaken.

I mention this in order to bring home to each of you the importance of supporting our organization whether or not you can at all times attend the conventions. You are the direct beneficiary. There are many people working hard, for no pay and, in numerous cases, little honor, to serve the great cause in which we are engaged.

Our cause has had its reasonable proportion of fair-weather friends and cynical critics, but on the whole, it has been singularly free from such influences. At the present writing, we have every reason to be optimistic. I believe, with considerable evidence to support such expectation, that we will have a large attendance at the New Orleans convention, December 5, 6, and 7. I believe our membership will increase over that of the preceding year. The prospect is most hopeful.

We have not only the incentive of our work to lead us to attend, but New Orleans is a great historical city with a flavor of its own, and for many of us, it will be the opportunity of a lifetime to visit that great city in the great southern section of our country.

R. L. Cooley, President,
American Vocational Association.

Don't Forget The Handle

Illustration shows Pocket Chisel No. 40—1″

THE cutting quality of a chisel is exceedingly important—but don't forget the handle.

Many otherwise good chisels are set aside and sometimes scrapped because the handles are badly battered or are lost.

Ordinary chisels will not stand much pounding with a hammer. This is an abuse that they may be subjected to, even though instructions may designate a mallet be used.

Stanley "Everlasting" Chisels with their one piece metal construction including head, shank and blade are built to stand rough treatment. The handle lasts the life of the chisel. It is always in place and offers no rough edges to scratch the user's hand. Even pounding with a hammer will not hurt Stanley chisel handles.

Made in three styles

Butt No. 50—length of blade 3″ Pocket No. 40—length of blade 4½″
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Each with twelve widths of blade—from ⅛″ to 2″

Have you a copy of our Catalog No. 34 with the special School Index? We shall be glad to send you a copy of each.

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See the Points?

Can you describe the "Point" of a twist drill?

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Or "Margin" and "Body Clearance"?

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As our contribution to the cause of education in correct machine shop practice, we shall be pleased to forward to you any reasonable quantities of the Handbook for the use of your machine shop classes.

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(Continued from Page 482)

MEETING OF THE INDUSTRIAL-ARTS CLUB OF PITTSBURGH

The Industrial-Arts Association of Pittsburgh and vicinity held a meeting at the Hotel Henry, Wednesday evening, October 16. The address of the evening was made by Dr. J. Freeman Guy, associate superintendent of the Pittsburgh public schools. Dr. Guy took as his subject "The Making of Boys" and stressed the important part that the industrial-arts teacher plays in the development of boys.

FRANCIS J. COYTE,
President, Industrial Arts Association of Pittsburgh and Vicinity

It was announced that Mr. Earl L. Bedell, director of industrial and vocational education of the Detroit public schools, and Mr. L. H. Dennis, deputy state superintendent of Pennsylvania, would be the speakers at the next meeting which will be held December 19. Both Mr. Bedell and Mr. Dennis traveled extensively in Europe last summer and their experiences will be of great interest to the members of the association.

The officers for the ensuing year were elected as follows: President, Francis J. Coyte, Arsenal Technical School; vice-president, John A. Ingram, Brookline School; secretary, Dean Conner, Ralston Industrial School; and directors, Alexander Coghill, Latimer Junior High School; and C. E. Vetter, Snodgrass Elementary School.—*George C. Donson.*

TENNESSEE INDUSTRIAL-ARTS TEACHERS HOLD MEETING

The department of industrial arts and vocational education of the Tennessee Education Association held its annual meeting October 30–31, at Knoxville, with Mr. LeRoy Hyder, of Morristown, as chairman.

Mr. C. H. Wilson, of the University of Tennessee, spoke on "The Relation of Teachers' Salaries to Training and Experience"; Mr. James Arentson, of Nashville, discussed "The Development of Vocational Education and Its Relation to the Industrial-Arts Program." Other speakers on the program were Mr. Paul W. Chapman, Athens, Ga., and Dr. Ernest R. Groves, of Chapel Hill, N. C.

TEXAS ASSOCIATION TO MEET

The Industrial Education Section of the Texas Teachers' Association will hold its annual meeting November 28–30, at Dallas. Sectional as well as general programs have been arranged.

New Trade School in New York City

The school board of New York City has awarded the contract for the construction of the new trade school, to cost $500,000.

MACHINE SHOP SUPERVISORS

Read this treatise on Shaper Design

YOU WILL READ

About selective multiple cam feeds that prevent feeding on the forward stroke;

About an Internal Transmission.

You will read about a VISIBLE automatic oiling system and a new style ram.

You will see illustrated a new shaper table specially designed for tool-room work.

You will read why a gib is put on the sliding crank block.

You will see illustrated a one-piece bull gear.

The Machine Tool Picture Changes

From year to year designs change and machines that were the best yesterday may be out of date today. Tools that lead are constantly being improved.

Keep Well Informed

Broad-visioned experts who carry the responsibility for the selection of the proper machine tools, study changing designs and investigate new tools. When they purchase a new tool, it must be modern as well as new.

An Opportunity to Study the Latest Shaper Design

Cincinnati Shaper Company's new catalog is more than a catalog—it is a treatise on modern shaper design. It illustrates the features found on the shaper that has established a definite leadership. A copy will be sent to you without obligation and without a salesman's call, if you wish. Just check the coupon and mail.

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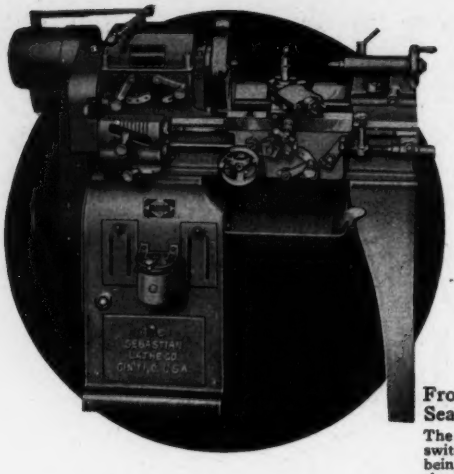

The 11-inch Gold Seal Heavy Duty Lathe was built to fill the need for a small, high speed lathe capable of production work and at the same time incorporating all the features necessary for extremely close precision work.

a safe lathe! The SEBASTIAN Gold Seal

From the standpoint of personal safety for the operator, the 11-inch Gold Seal heavy duty lathe is unsurpassed.

The motor is built in the leg beneath the headstock and is controlled through a convenient switch within easy reach of the operator. There are no open belts or exposed pulleys, drive being accomplished through a fully enclosed, safe, motor chain. All speed changes are obtained through two levers at the front of the headstock—no removal or insertion of separate gears is necessary and it is impossible to jam the gears by locking in two speeds simultaneously.

Starting and stopping of the lathe itself is independent of motor control and is accomplished by a friction drive controlled by a lever within easy reach. All feeds and threads are controlled by two levers on the quick change box and one sliding on the quick change tumbler shaft. It is absolutely impossible to engage both lead screw and feed shaft at the same time.

The lathe itself is carefully protected against damage due to carelessness or overload. It is the heaviest machine of its size built and in addition it is provided with a safety shear pin at the end of the quick change box. This pin will shear under dangerous overload before any damage can be done to the lathe itself.

Safety should be a dominating feature of every school machine, and we honestly believe there is no safer lathe than the SEBASTIAN Gold Seal.

Gold Seal SEBASTIAN LATHES GUARANTEED CORRECT

THE SEBASTIAN LATHE CO.
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New York Office—Room 372—50 Church Street

ANNUAL SALE OF CHRISTMAS SEALS

The annual sale of tuberculosis Christmas seals will be conducted during the year 1929 from Thanksgiving to Christmas. Tuberculosis in Wisconsin has been reduced nearly one half, from 109.3 per 100,000 population in 1908, to 59 in 1928, and has moved from first to seventh place as a cause of death.

Christmas seals on letters and packages have proved helpful in carrying the message and in arousing public interest in the health campaign.

NOW, ARE THERE ANY QUESTIONS?

Removing Iodine Stains

896. Q.: One of my former students has an oak table which he made in our shop. It has a varnish finish. There has been some tincture of iodine spilled on the top. Please tell me how this iodine stain can be removed. Will alcohol remove the stain without cutting the varnish?—*H. L. D.*

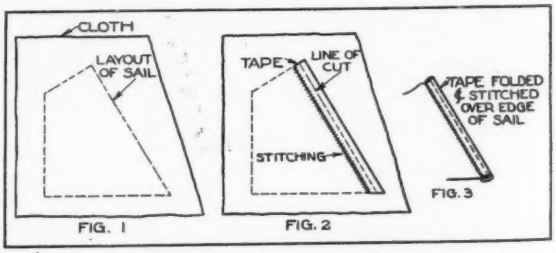
A.: Removal of the tincture of iodine from a varnished surface is quite a difficult proposition, for by the time you receive this answer the chemical action will have completed itself and the iodine compounds become a part of the varnish.

The use of alcohol will only spread the stain by further dissolving traces of iodine and will attack the varnish as well. Ammonia in solution will bleach the iodine to the colorless ammonium iodide salt but in this case also, the varnish will be destroyed.

In the last analysis nothing remains but to strip the surface with remover; wash with alcohol to remove traces of grease; sand; bleach with oxalic acid solution, and when almost dry, repeat with a hot concentrated borax solution to give additional bleaching and to neutralize the acid. After drying, resand and refinish. Any other attempt is almost certain to be merely temporary and more or less unsatisfactory.—*Ralph G. Waring.*

Sails for Model Boats

897. Q.: Will you please send me the name of a book which deals with making the sails, or please send me any other instructions you have concerning making the sails for the sheet-metal sailboat described on page 200 of the May, 1929, issue of the INDUSTRIAL-ARTS MAGAZINE.—*M. S.*

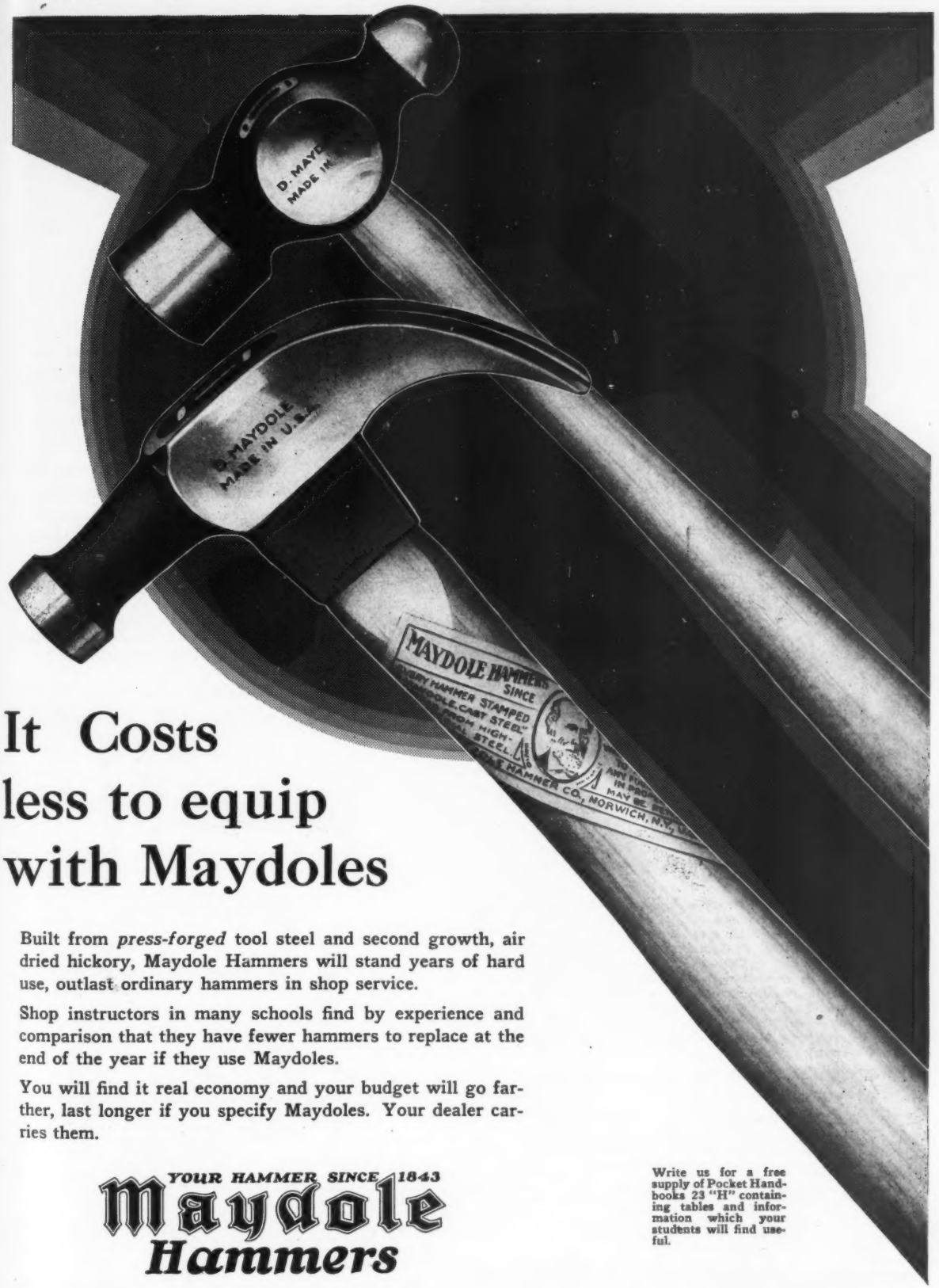


A.: We have looked through a number of books on miniature boat building to find something on sail making, but have found very little. Probably the following description and sketch will answer your purpose.

1. Wash and iron a piece of cloth large enough for the sail.
2. Lay out the shape of the sail on the cloth. (See Fig. 1.)
3. Sew a piece of tape along the line of cut. (See Fig. 2.)
4. Cut out the sail along the cutting line.
5. Fold the tape over the edge of the sail and sew it down as shown in Figure 3.

Finish the other edges of the sail in the same way.

(Continued on Page 33a)



It Costs less to equip with Maydoles

Built from *press-forged* tool steel and second growth, air dried hickory, Maydole Hammers will stand years of hard use, outlast ordinary hammers in shop service.

Shop instructors in many schools find by experience and comparison that they have fewer hammers to replace at the end of the year if they use Maydoles.

You will find it real economy and your budget will go farther, last longer if you specify Maydoles. Your dealer carries them.

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Write us for a free supply of Pocket Handbooks 23 "H" containing tables and information which your students will find useful.

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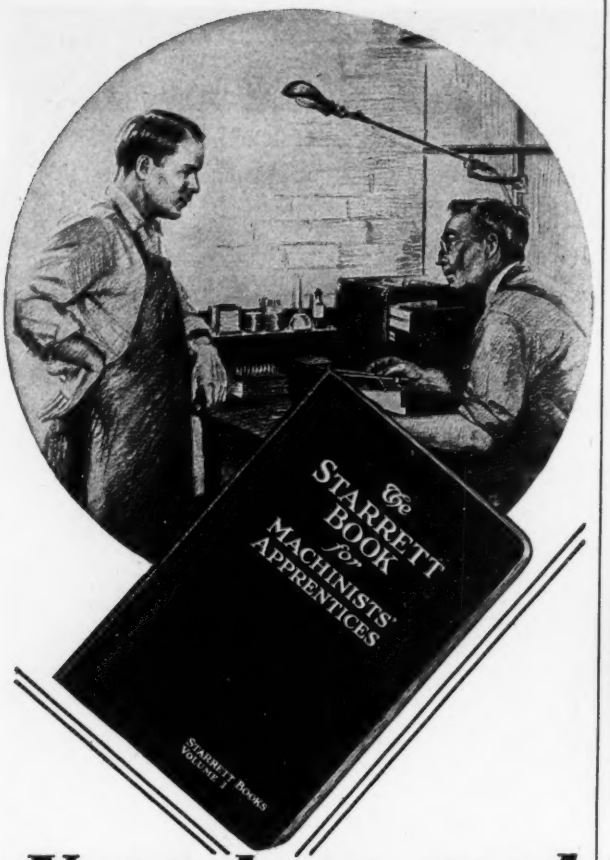

Your boys need this handbook

With shop classes the size they are nowadays, you can't be at every boy's elbow at once. But if each of your young machinists has a Starrett handbook, you can start them out right and then let them dig out the dope themselves.

The Starrett Handbook for Machinists' Apprentices prepared by experts, has become a standard text in shops throughout the country. In it, your boys can find what they want to know, written so simply and clearly that they can understand it with only occasional help from you. It will speed up the progress of your classes, develop initiative in your boys, allow you to give your personal attention to more interesting problems.

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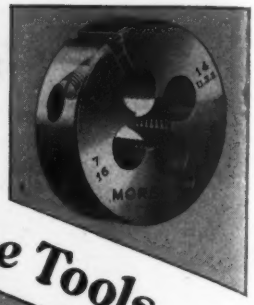
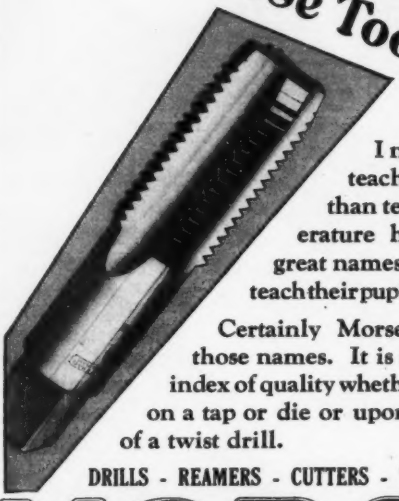
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
ATHOL, MASS., U. S. A.

Use Starrett Tools

3431

Finely Made Like All Morse Tools





Industrial teachers no less than teachers of literature have certain great names which they teach their pupils to respect.

Certainly Morse is one of those names. It is an accepted index of quality whether it appears on a tap or die or upon the shank of a twist drill.

DRILLS - REAMERS - CUTTERS - TAPS and DIES

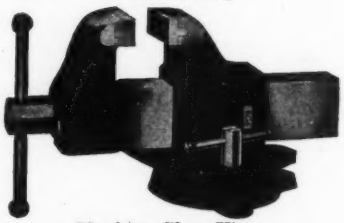
MORSE

TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASS., U.S.A.

FOR CRAFTSMAN OR STUDENT

Woodshop Vise

Steel Clamp



Machine Shop Vise

THE COLUMBIAN VISE & MFG. CO.
9021 Bessemer Ave. Cleveland, Ohio

COLUMBIAN VISES

(Continued from Page 30a)

Drawing-Room Cabinets

898. Q.: I am thinking of building a low cabinet in my drawing room in which to keep the drawing equipment of my designs on hand or in any issue of your INDUSTRIAL-ARTS MAGAZINE.—*C. W. M.*

A.: There is a design for a drawing-room cabinet on page 317 of the September, 1926, issue of the INDUSTRIAL-ARTS MAGAZINE, and a drawing-paper holder on page 350 of the September, 1925, issue. I do not know whether these two references will help you out very much, as you specify a low cabinet. Probably it would be best if you would design a cabinet to fit your own needs.

The method of doing this would be, first of all, to decide just what you want to put into the cabinet. Supposing that this would be a number of sets of instruments, the same number of 30-, 60- and 45-deg. triangles, and an equal number of scales and T squares.

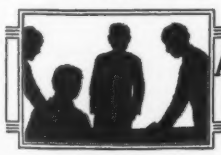
Individual trays, about 1½ in. deep, 6½ in. wide, and 13 in. long, inside dimensions, could be made to hold one set of instruments, a 30-60 deg. triangle, a 45-deg. triangle, a drafting scale, one or two pencils, and an eraser. These instrument trays may be accommodated in your cabinet either on shelves or on slides, like drawers. Knowing the number of trays that you will need for your class, will at once give you some idea of the space which they will occupy in the cabinet. They may be arranged either in one single vertical column, or in two vertical columns, or in any other arrangement that may be suitable.

Space must then be devised for the T squares. Probably the best way to handle them is to hang them all on a single peg. This may be put into one of the side walls of the cabinet or into the back. Space also must be provided for the storage of drawing paper, tracing cloth, etc. To do this, decide upon the size of paper that is to be used in the drafting classes, and determine whether it is to be ordered in sheets which are cut to size, or whether you want to use drawing paper or tracing cloth which comes in rolls. You may also want to store inks.

Space must be provided for storing the finished and unfinished work of the students. To do this, individual shelves for the different classes or for the different days will have to be designed.

After you have decided on what you want to put into the cabinet, then try different arrangements of the spaces which are required for the various items, in order to get them as compactly placed as possible. In this way you will be able to design your own cabinet for your own needs.

There are at present some very fine steel cabinets made which will be found very convenient in the drafting room. It might pay you to get prices and catalogs from the following firms before you start building your own cabinets, telling them what you want to use the cabinets for: Durabilt Steel Locker Co., 400 Arnold Avenue, Aurora, Ill.; Eugene Dietzgen Co., New York, N. Y.; The C. F. Pease Company, 802 North Franklin St., Chicago; Keuffel & Esser Co., Hoboken, N. J.; U. S. Blue Company, 201 S. Wabash Ave., Chicago; and The Frederick Post Co., P.O. Box 803, Chicago.

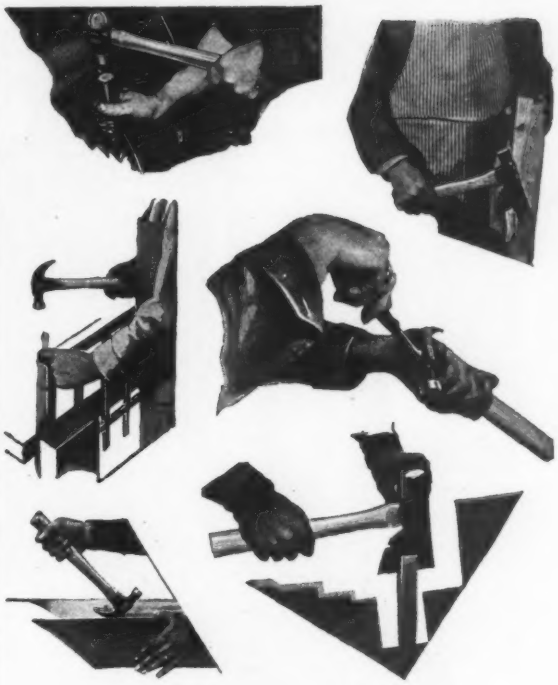


AMONG the INDUSTRIAL ARTS TEACHERS

MR. ROBERT P. TAYLOR, formerly on the faculty of the Manchester, Conn., trade school, has been appointed as instructor in shop mathematics at the Baron de Hirsch Trade School in New York City. Mr. Taylor is a graduate of Pratt Institute, Brooklyn, N. Y., and has had seven years of experience in teaching the trades.

MR. C. F. CRILEY, formerly assistant principal of the Lathrop Trade School at Kansas City, Mo., has taken up his duties as director of the vocational education program at Owensboro, Ky. MR. E. W. GILBERT has charge of the automotive-mechanics classes, and MRS. D. W. DUKE teaches the academic subjects in the trade school.

(Continued on Page 34a)



When expert hands need the finest tools...

WHEN the expert, with the skilled hand and exacting eye, acquired through years of training—needs the finest tools . . . How much more does the boy need those features which only a fine tool has.

Help his unskilled hands gain confidence; add a new zest to that period in the shop.

Give him a Plumb Hammer—the tool of expert carpenters. Its long, easy swing is *balanced* for his arm. Its knife-like claws pull even a headless brad.

Or the Plumb Hatchet, with its keen blade and its accurate "hang" which sends every stroke where he aims it.

Safest for School Shops

Every Plumb Tool is safe . . . a vital feature in school shop tools. Plumb's patented wedge enables you to retighten any loose handle instantly, just by a turn of the screw.

Specify Plumb—with the Red Handle and Black Head. Write for catalog showing line.

FAYETTE R. PLUMB, Inc., Philadelphia, U. S. A.

PLUMB
DOUBLE LIFE
Hammers Hatchets
Files Sledges Axes

In many places It is a relief to be able to ratchet screw home with one hand.

Tiny screw started by turning blade with thumb and forefinger.

Here is a lesson in efficiency

With old-fashioned screw-driver you have to grip-and-let-go, grip-and-let-go, fifty to a hundred times, in driving a screw.

With a "Yankee" Ratchet Screw-driver you grip the handle just once,—and with the first good grip simply turn to and fro. The "Yankee" Ratchet—smooth as the stemwind of your watch—drives the screw.

No. 15.—Takes care of pesky little screws. "Thumb-turn" on blade starts the wobbly screw. Ratchet movement drives it home. Blade, 3/16" diameter. Six lengths: 2", 70c; 3", 75c; 4", 80c; 5", 85c; 6", 90c; 8", 95c.

No. 10.—For husky screws. Eight blade lengths: 2", 65c; 3", 80c; 4", 85c; 5", 95c; 6", $1.05; 8", $1.20; 10", $1.45; 12", $1.60. Ratchet Shifter moves lengthwise.

No. 11.—Same as No. 10, except Ratchet Shifter moves across tool. All have right and left ratchet and rigid adjustments.

Write for "Yankee" Tool Book—FREE
NORTH BROS. MFG. CO., Philadelphia, U. S. A.

"YANKEE" TOOLS

MAKE BETTER MECHANICS

(Continued from Page 33a)

Miss Lilah Holloway has been elected as director of the part-time continuation school at Salem, Oreg. Miss Holloway succeeds Mrs. Lillian Van Loan, who has gone to Medford

Mr. S. Grant Connor, of Aliquippa, Pa., has been employed by the Ohio State Board of Vocational Education to carry on pioneer work in apprenticeship training in industry for fiifteen cities of northeastern Ohio.

Mrs. O. B. Stitely, of Peoria, Ill., has been appointed as rehabilitation field agent for the state vocational-education department. Mrs. George Arbeiter, of Joliet, Ill., has been appointed as a second field agent for the same department.

Mr. E. B. Matthew, formerly supervisor of vocational agriculture in Arkansas, has been appointed director of vocational education for the state education department. Mr. R. B. Smith, formerly itinerant teacher trainer, has been appointed to succeed Mr. Matthew.

Mr. F. W. Miller has been appointed as printing instructor at the Masonic Home and School, Fort Worth, Tex.

Mr. T. B. Portwood, of Atchison, Kans., has been elected principal of the Main Avenue High School, which has been turned into a vocational school for specialized activities in day and evening-school work.

Miss Sadie Oliver has been elected as an instructor at the evening vocational school, Dallas, Tex.

Mr. W. H. Butler, of Dallas, Tex., has been appointed director of vocational guidance in the high school. Mr. Butler, who is well qualified by training and experience for the work, has prepared an interesting program for the Dallas schools.

Mr. C. B. Knight, Mr. R. C. Patterson, Mr. Frank Prin, Mr. James Hunt, and Mr. H. L. Leslie, are the new teachers of industrial arts at Houston, Tex.

Mr. J. T. Reynolds has been elected director of vocational education in day and evening work at El Paso, Tex.

Mr. W. L. Ward has been elected director of the vocational work at Goose Creek, Tex. New courses in woodworking and mechanical drawing are offered to the students.

Professor John Shapley, formerly head of the art department at New York University, has become professor and chairman of the art department at the University of Chicago. Professor Shapley is regarded as one of the eminent scholars in the country in the field of art. He holds degrees from the University of Missouri, Princeton University, and the University of Vienna.

Mr. Francisco C. Urgell has been appointed general supervisor of manual- and industrial-arts work at Santurce, P. R.

Mr. J. J. Matthews, formerly assistant director of industrial education for the state education department of Pennsylvania, has taken up his duties as assistant professor of mechanical engineering at Swarthmore College, Swarthmore, Pa.

Mr. Matthews is a graduate of Swarthmore College, and has had considerable trade experience. He was connected with the American Can Company of New York for some time, also with the Cincinnati Milling Machine Company of Cincinnati, Ohio, the Miller Lock Company, and Stokes and Smith Machine Company. He had served as director of industrial education at Chester, Pa., for a period of six years, and for the past five years had been connected with the state education department. During the past two years, Mr. Matthews was in charge of a study of special problems in foremanship improvement in the vicinity of Philadelphia. He had also participated in a program for foremanship training and leadership, developed in cooperation with the laundry owners' exchange, the metal manufacturers, and the retail meat dealers.

Mr. Matthews goes to Swarthmore with a rich background of training and experience, and with practical experience for carrying on the work in machine design and mechanical engineering in the college.

APPOINTED PRINCIPAL OF TRADE SCHOOL

Mr. I. R. Anderson, formerly a foreman-conference director for the Missouri and Oklahoma state boards of vocational

(Continued on Page 37a)

THE WORLD'S BEST JUDGES of CONSTRUCTION SELECT SHELDON BENCHES

When a vocational director buys manual training benches there is no guess work about it. He is the *world's best judge* of construction methods. He can *scientifically* pick the bench that will give the best service. That's why the strongest point in favor of Sheldon benches is the fact that for more than a quarter of a century the leading vocational directors of the country have selected Sheldon benches for over 20,000 schools. Benches still in use that were installed 25 years ago offer convincing evidence that these men choose wisely.

Get the Sheldon catalog before you buy. Compare Sheldon benches point by point with all other makes. Then we'll leave the decision up to you.

E. H. SHELDON & CO. MUSKEGON, MICH.
VOCATIONAL FURNITURE

(Continued from Page 34a)

education, has recently been appointed as principal of the Lathrop Trade School at Kansas City, Mo. Mr. Anderson is the first principal of the school, whose fundamental training has been idustrial and whose experience has been gained in the industry. Mr. Anderson was formerly employed by the Federal Board for Vocational Education and has at various

I. R. ANDERSON,
Principal, Lathrop Trade School,
Kansas City, Missouri

times served as personnel director, sales manager, and superintendent for several large industrial plants, including the E. I. DuPont de Nemours Company, of Wilmington, Del. In addition, he has taught at the Oklahoma School of Mines and the Colorado Agricultural College.

Industrial Arts in Education

By Dean M. Schweickhard. Cloth, 367 pages, 5¼ by 7⅞, illustrated. Price, $3. Published by The Manual Arts Press, Peoria, Ill.

The author of this book has succeeded in showing the position of industrial arts in our present-day system of public education very well. Not everyone will agree entirely with his philosophy of education. Nevertheless, that portion of the book given to the industrial arts is well done. The principles underlying industrial education, the bases upon which the industrial-arts instruction in schools may be organized, the application of industrial-arts work in the elementary and intermediate school, and the relationships which can be made between this subject and the other subjects taught, are comprehensive and thorough. The immediate objectives and scope of the industrial arts in schoolwork are quite thoroughly discussed, and the organization and presentation of shop courses, together with the guidance function of the work in school is interestingly handled, as is also the discussion on the question of the vocational function of the industrial arts. There also is a helpful chapter on the preparation of the industrial-arts teacher and appendixes A and B give definite outline courses of study for the elementary and the intermediate schools.

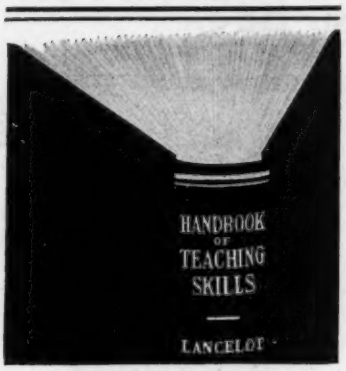
Elementary Free-Hand Drawing

By W. Earl Brownjohn. Twenty-four loose-leaf sheets, 8¾ by 11⅞. Price, 68 cents. Published by The Bruce Publishing Company, Milwaukee, Wis.

This series of elementary free-hand drawing lessons consists of 24 plates, which contain 40 drawing lessons involving the drawing of 70 different objects. The objective of these

(Continued on Page 38a)

Progressive Ideas in Teaching



Handbook of Teaching Skills

By W. H. Lancelot

Head of Department of Vocational Education, Iowa State College

Who is a good teacher?—How our minds retain knowledge—The natural springs of interest—Arousing the feeling of need for knowledge—Suspense as a means of control—Developing interests that will endure—Teaching students to think well—Guiding our students in problem solving.—These and many other equally interesting topics are treated according to modern and progressive ideas.

Price $2.00

Other Wiley Books

METHODS AND TEACHING PROBLEMS IN INDUSTRIAL EDUCATION. By F. Theodore Struck.....Price, $2.75

GUIDANCE AND EDUCATION OF PROSPECTIVE JUNIOR WAGE-EARNERS. By Frederick M. Trumbull.....Price, $3.00

SUPERVISION OF VOCATIONAL EDUCATION. By J. C. Wright and C. R. Allen. Price, $3.00

ADMINISTRATION OF VOCATIONAL EDUCATION. By J. C. Wright and C. R. Allen. Price, $3.00

EFFICIENCY IN EDUCATION. By J. C. Wright and C. R. Allen...Price, $3.00

EFFICIENCY IN VOCATIONAL EDUCATION. By J. C. Wright and C. R. Allen. Price, $3.00

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☐ Methods and Teaching Problems in Industrial Education ($2.75)
☐ Guidance and Education of Prospective Junior Wage Earners ($3.00)
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☐ Efficiency in Vocational Education ($3.00)
I agree to remit the price of the book within ten days or return it postpaid.
Name.....
Address.....
Position or Reference.....IA 12-29

(Continued from Page 37a)

lessons is to ground the student in the principles of perspective, and the problems all call for the representation of commonplace articles, so that the student is perfectly familiar with them.

Standard Practice in Sheet Metal Work

Compiled by The National Association of Sheet Metal Contractors. Fabrikoid cover, 768 pages, 9 by 12⅜, illustrated. Published by The National Association of Sheet Metal Contractors, 336 Fourth Avenue, Pittsburgh, Pa.

This reference book of standards of practice in fabricating and erecting sheet-metal work for the building industry, was collected and prepared by the trade-development committee of the National Association of Sheet Metal Contractors. The book contains 768 pages of valuable information, layouts, tables, and specifications, completely describing standard practice in sheet-metal work. Architects, engineers, sheet-metal contractors, installers of warm-air heating systems, and instructors of the building trades in part-time and full-time vocational schools, will find this book extremely helpful.

Junior Color Tablet

By H. Francis James. Twenty-four loose-leaf sheets, 8¾ by 11⅝. Price, 35 cents. Published by The Bruce Publishing Company, Milwaukee, Wis.

This series of loose-leaf lessons consists of 24 plates. They are designed for color work in the fifth and sixth grades. The lessons embody all the fundamental ideas of color, and ground the children in the underlying principles of mixing colors, graying colors, and harmonizing colors. The method embodied in the lessons is sure to interest the pupils, and a child who has taken these lessons fully understands the meaning of primary, secondary, and tertiary color work.

The Magic Vase

A pageant of the history of pottery, prepared by the art department at Hamtramck, Mich. Printed by the high-school printshop and issued by the board of education of Hamtramck, Mich. A bit of creative work, which indicates the progress of the pupils in the basic skills. It comprises a prolog and five episodes, dealing with the pottery industry in the different countries.

Storage Batteries, Operation and Repair

Paper, 69 pages. Price, 15 cents. Issued by the Navy Department, Bureau of Engineering, Washington, D. C.

The Gluing of Wood

By T. R. Truax. Paper, 77 pages. Price, 25 cents. Bulletin No. 1500, June, 1929, U. S. Department of Agriculture, Washington, D. C. The purpose of the pamphlet is to bring together essential information about glues and gluing, and to outline methods which have been found to give satisfactory results. It discusses the preparation of glues for use, pressing and clamping, drying and conditioning glued joints, treating of wood before gluing, and the correction of glue defects.

Children in Agriculture.

By Nettie P. McGill. Paper, 81 pages. Publication No. 187, of the Children's Bureau, U. S. Department of Labor. A summary of the findings in an investigation of the work of children in agriculture made by the children's bureau and by other agencies. The booklet discusses the work of children on farms, the outlook for children in agriculture, truck farming, tobacco culture, and the value of farmwork for children. Considerable information is given regarding hours of work, causes of absence from school, the length of the school term, and schooling for hired laborers. There is also a chapter devoted to the legal regulation of employment for children in agricultural pursuits.

Extension Methods and Their Relative Effectiveness.

By M. C. Wilson. Paper, 47 pages. Technical Bulletin No. 106, February, 1929. Published by the U. S. Department of Agriculture, Washington, D. C. The bulletin gives the results of studies in agriculture conducted in fourteen states and includes data from more than 10,000 farms. The data will

(Continued on Page 41a)

(Continued from Page 38a)

serve as a reliable guide to extension agents in carrying on their work, and will be of significance to students desiring to prepare themselves for positions in the extension service.

Report of Foremanship Conferences of the Southern Pacific Railroad, Los Angeles, Calif.

Paper, 49 pages. Issued by the Department of Vocational Education, Los Angeles, Calif.

The pamphlet is a report of the foremanship conferences conducted by the Department of Vocational Education of the Los Angeles city schools, in cooperation with the State Board of Education, the Federal Board, and the Southern Pacific Railroad. The conferences took up responsibilities, orders, cooperation, accidents, characteristics of leadership, scheduling of engines and cars, and instruction of the foreman on the job.

Proceedings of the Fifth National Conference on Vocational Rehabilitation of Disabled Persons.

Paper, 212 pages. Bulletin No. 136, Vocational Series No. 18, February, 1929, issued by the Federal Board for Vocational Education, Washington, D. C.

This is a report of the fifth vocational rehabilitation conference, held at Milwaukee, Wis. The conference was attended by representatives of state rehabilitation departments and others interested in the rehabilitation work. Among the subjects taken up at the conference were: methods of determining capabilities of disabled persons; methods of determining employment opportunities; qualifications and attitude of the advisers; scientific principles in case work; and publicity and promotion.

Division of Research in Higher Education.

Paper, 60 pages. Second annual report of progress by the University of Pittsburgh, Pittsburgh, Pa.

The pamphlet offers a report of the activities of the division of research in education and of the projects undertaken during 1927-28. It takes up such topics as selection of vocational student teachers, foundry apprentice curricula, and educational-guidance activities.

Trade and Industrial Education.

A discussion of standards by Frank Cushman and C. F. Klinefelter. Paper, 148 pages. Bulletin No. 17, Trade Series No. 1, March, 1929, issued by the Federal Board for Vocational Education, Washington, D. C.

This report is a revision of the former report on the organization, administration, and operation of trade and industrial education under the direction of the Federal Board. Part I of the bulletin covers the legal and administrative standards which should be observed in state plans, together with a brief of those sections of the national vocational-education law which directly affect trade and industrial education, and a brief discussion of the need for a public program of trade and industrial education, and a chapter on the functions of the schools. Part II takes up analyses of the three principal types of organizations for giving trade and industrial education and deals with matters pertaining to efficiency in operation. The analysis charts for evening, part-time, and all-day schools are included as part of each section. Part III offers a constructive discussion of supervision and teacher training. Each of the principal types of organization is discussed with respect to the possibilities of rendering effective service. The more important characteristics of efficient state programs of trade and industrial teacher training are discussed constructively on the basis of an analysis of the needs of the situation.

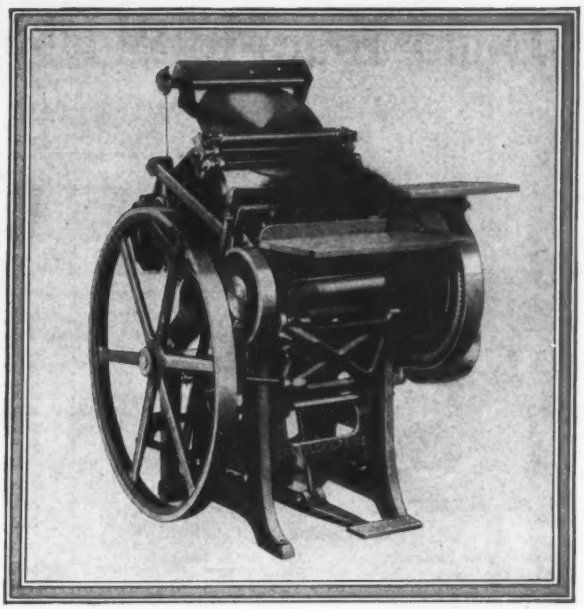
Recent Economic Changes in the United States.

Paper, 32 pages. Price, 5 cents. Published by the U. S. Department of Commerce, Washington, D. C.

A report of a survey of recent economic changes completed in 1929. The material covered an appraisal of the factors of stability and instability; in other words, it was the purpose to describe the American economy as a whole, suggesting rather than developing recommendations.

Thirty-fourth Annual Report of the Western Arts Association for 1928.

Contains a report of the proceedings of the last annual meeting held at Indianapolis, Ind.



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The Lightest Lumber used in Ford and Boeing Planes ~

Model plane builders — follow the Aviation leaders — use Genuine Lata Balsa Wood, the only properly kiln dried and heat treated lumber that Ford, Boeing and the rest of the outstanding aircraft manufacturers use in building their planes. With Lata Balsa you will enjoy the thrill of reproducing all the famous aeroplanes accurately and scientifically. You will achieve the sensation of combining all the flying qualities with light weight and strength, making your planes practically crash proof. You can send a Lata Balsa built model plane soaring and zooming and it won't break up after many flights. Enjoy your fun—build your planes the Lata Balsa way.

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Dwight Hinckley Lumber Co. Cincinnati and Cleveland, O.	**Ehrlich-Harrison Co.** Seattle, Wash.

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LATA BALSA WOOD

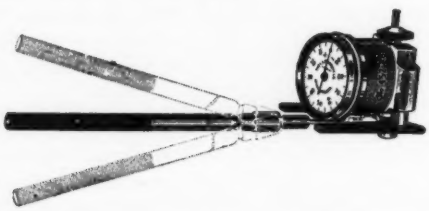
THE WOOD OF LITTLE WEIGHT AND MANY USES

School Shop Equipment News

For the Supervisor and Teacher who desires to keep abreast with news of New Machinery, Tools, Supplies, etc.

ANNOUNCE NEW STARRETT CYLINDER GAUGE AND STEEL RULE

The L. S. Starrett Company, of Athol, Mass., has produced a new No. 452 AA junior cylinder gauge, which is intended for measuring small bores.

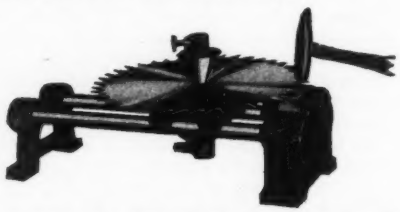


The gauge has a capacity of 1⅞ in. to 2½ in., and operates in the same manner as the larger gauges Nos. 452 A and 452 B. It has a hardened and ground steel sled and contact points, which insure long wear and accuracy, a double-spring action which makes the gauge self-centering and non-collapsible, and an adjustable dial which is calculated by thousandths. The gauge is capable of accurately determining tapered, out-of-round, or scored cylinders, and is an ideal tool for service stations or motor repair shops doing reboring or regrinding work.

The firm has also announced a new flexible steel rule No. 325, which has the usual graduations, as well as every fourth graduation of 32nds and eighth graduation of 64ths numbered. The tool offers to mechanics another means for quick reading of figures, and is furnished in a metal-bound pocket case at no additional charge.

NEW ATKINS SAW SET

The E. C. Atkins Company, of Indianapolis, Ind., has announced a new A-Z Saw Set as an addition to its present excellent line of tools for the school shop.



The new saw set makes all circular saws smooth-cutting, eliminates the expensive hollow-ground saws, reduces millwright and belt expense, and makes for greater efficiency and speed in productive shopwork.

Complete information and prices of the A-Z Saw Set may be obtained by writing to the E. C. Atkins Company at Indianapolis, Ind.

NEW COATED ABRASIVE BOOK

The Behr-Manning Corporation, of Troy, N. Y., has issued a new booklet of 24 pages, illustrating and describing its line of coated abrasive products conforming to the simplified practice recommendations of the U. S. Department of Commerce.

The booklet lists and describes garnet, durundum adalox, carbicon-durite, metalite-adamite, flint, emery cloth and crocus cloth, silicon-carbide paper, flint paper, and pouncing

(Continued on Page 44a)

Ornamental Concrete

—learn how to make it

OUR catalog illustrates, describes and tells how to use architectural molds from which beautiful concrete art objects that are quickly salable can be made at small cost—bird baths, sun dials, urns, lawn seats, pedestals, flower boxes, jardinieres, etc.

This is a book that should interest every trade school instructor. It will be sent on request without obligation.

Consolidated Concrete Machinery Corpn.,
913 East Beecher Street
Adrian, Michigan

Curved lawn seat.

LUMBER FOR MANUAL TRAINING

We specialize in

Phillippine INDOAKO Wood

(formerly sold by us as "Philippine Mahogany")

THE IDEAL WOOD FOR SCHOOL WORK

All Philippine INDOAKO bearing this trade-mark, carries our guarantee of replacement, without charge, if found to be below grade.

Due to the high quality of our stock, its freedom from defects, and moderate cost, it is one of the *most economical* woods you can use for your projects.

Write today for sample, circular and price-list.

INDIANA QUARTERED OAK CO.
224 East Ave. . . . . Long Island City, N. Y.

Now Available

"The Greatest book of its kind ever produced for student or teacher in the wood working classes."

Hundreds of letters have come to us in response to the distribution of the Author's Edition of "The Book of Projects."

Teachers and students alike have been enthusiastic in their praise. What we thought was a good effort turned out to be something greater.

Thirty-three pages of projects with complete drawings—thirteen pages devoted to ornamentation—beautifully printed—text clear and simple to understand—

Truly a book that will raise the standard of vocational work in the school and home.

"It should be in the hands of every teacher and student for every day reference—"

Still a few copies left for complimentary distribution to teachers and heads of wood working instruction who write us on school stationery.

Priced at only one dollar for general distribution.

KLISE MANUFACTURING COMPANY
Grand Rapids Michigan.

Make This Attractive Magazine Tray

Several hours fascinating enjoyment making this practical magazine tray. 36 illustrations showing each step in weaving accompany each project.

Materials Cost only $1.00

All materials are furnished ready for you to assemble the frame, and weave according to the illustration description. Plenty of Art-Fibre weaving materials in black and orange color combination are furnished. Drilled base, dowels, nails, silence domes, glue sizing, and directions are furnished for only $1.00 plus parcel post charges, (up to 150 miles 11 cents; up to 300 miles 16 cents; up to 600 miles 24 cents).

Fascinating Class Room Projects

Art-Fibre Furniture Weaving, of which this magazine tray is a typical project, provides fascinating practical handcraft work for schools at small cost. Only a few inexpensive tools are required for classroom work. Chairs, tables, desks, lamps, footstools, ferneries, radio cabinets, smoking stands and other practical projects can be made at small cost.

Send for New Book of Designs

Send ten cents for new illustrated book of designs showing more than 100 projects that are practical for classroom work.

GRAND RAPIDS FIBRE CORD CO.
609 Myrtle St. N. W. Grand Rapids, Michigan

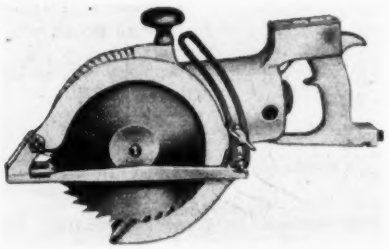
(Continued from Page 42a)

paper. The firm offers to supply special size sheets cut from any basic product listed in the book, and supplied on special order in sizes up to a maximum area of 400 square inches, and a maximum dimension of 35 inches.

Complete information and prices may be obtained from the Behr-Manning Corporation at Troy, N. Y.

NEW WODACK JUNIOR PORTABLE ELECTRIC HANDSAW

The Wodack Electric Tool Corporation, of Chicago, Ill., has recently placed on the market a new light-weight, one-hand electric saw for use in the school carpentry shop.

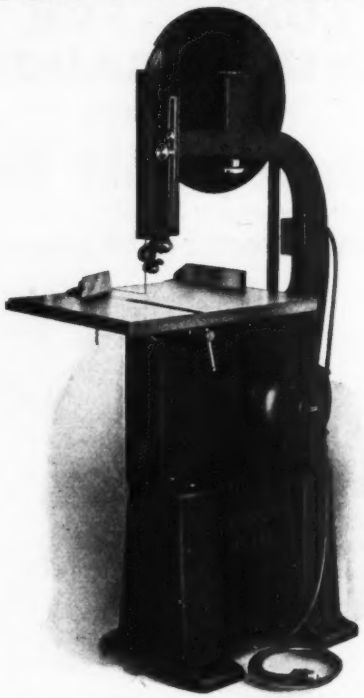


WODACK PORTABLE ELECTRIC HAND SAW

The new saw is complete, ready for use, and is equipped with accessories, including extension cord, lubricant, grease gun, steel carrying case, adjustable depth gauge, and rip gauge, and is capable of cutting boards up to 2⅝ in. thick.

NEW OLIVER NO. 192 PORTABLE BAND-SAWING MACHINE

The Oliver Machinery Company, of Grand Rapids, Mich., has just placed on the market a new 18-in. portable band-sawing machine, which is a new addition to the firm's large line of high-grade, dependable, easy-operating band saws.

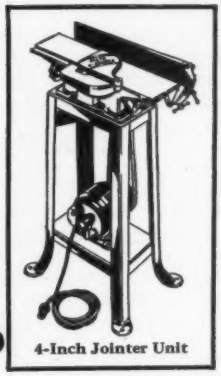


The new No. 192 is a self-contained, portable machine, fitted with motor on shaft, cord, and switch. A special feature of the machine is its exceptionally large cast-iron table, with

(Continued on Page 46a)

Announcing— The New "1930" Models "Delta" Woodworking Units

PRACTICAL DESIGN—DEPENDABLE QUALITY
PLUS MANY EXCLUSIVE FEATURES



4-Inch Jointer Unit

Patent Pending—Patented Jan. 1, 1929

The introduction of the Delta Jointer and Circular Saw Units marks a new era in moderate-priced woodworking equipment. Now, for the first time, are available sturdy, practical machines in compact, convenient form at price levels astonishingly low. The new Delta Units include:

1. Combination 4" Jointer and 8" Circular Unit.
2. 4" Jointer Unit.
3. 8" Circular Saw Unit.

Our New Moulding Cutter
Cuts Over 50 Moulding Shapes With Only 4 Sets of Blades

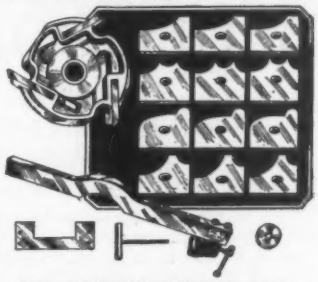
Interchangeable high speed blades produce over 10,000 cuts per minute at 3500 RPM. Blades require no individual adjustment. Quickly and easily locked in position. Special guide fence. Unusually low price.

Mail Coupon Today

No Obligation

Delta Specialty Co.
Division of
DELTA MANUFACTURING CO.
1661-67 Holton St. Milwaukee, Wis.

New "DELTA" Moulding Cutter



There is Nothing Like it on the Market Today

DELTA SPECIALTY COMPANY, Dept. M-129
Div. of "Delta Manufacturing Co."
1661-67 Holton St., Milwaukee, Wis.

Please send me FREE, illustrated literature describing 1930 model "Delta" Woodworking Units.

Name.....
Address.....
.....

DAKALITE

PADLESS ARTISTIC DAKALITE ECONOMICAL CONVENIENT

OFFERS--

Quick drying Oil-less Fillers and Stain Fillers

Just as effective for the school shop as the Furniture Factory.

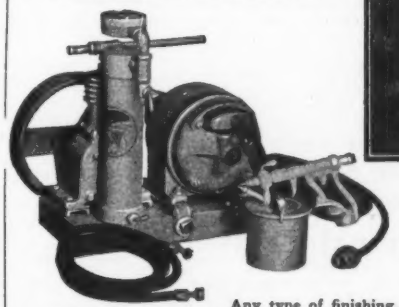
Ask about these New and Different Dakalite Products.

And don't forget—a FULL LINE of the very best finishes for all surfaces. Ask for information.

DAKALITE PRODUCTS., INC.
13,000 Athens Ave. Cleveland, Ohio

Paasche PORTABLE AIRPAINTING UNIT

IDEAL FOR SCHOOL SHOPS



F-518 electric, portable unit, complete in every detail, does the widest variety of work. Operates from any light socket.

Price $58.35.

Any type of finishing, painting, decorative work can be done quickly after short training. Paasche equipment for airpainting and airfinishing is compact and economical, yet complete in every detail, and of the same quality as used by thousands of industrial firms and professional decorators.

Give your classes the advantage of the perfected Paasche equipment. Write for bulletins with full descriptions of Paasche superiority.

Paasche Airbrush Co.
Educational Division
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New York Philadelphia Cleveland St. Louis Los Angeles
Boston Pittsburgh Detroit Denver Seattle

Hughes-Owens Co., Ltd., Montreal, Winnipeg, Toronto, Ottawa

PERFORMANCE PROVES PAASCHE SUPERIORITY

IAM-12-Gray

BLUE BOOK SERIES

Just off the Press

Vocational Texts on Many Subjects

Over Two Hundred Handy Volumes

Authoritative — Practical — Well Illustrated

The instruction material in these new books represents the best that experts in their various subjects can produce. Each text has been carefully edited, the subject matter is free of ambiguous statements, and it gets down to the intelligence level of the pupils. Those who helped to produce the texts also teach from these same books.

Easy to Understand—Easy to Apply

Complete list of Auto Mechanics Blue Books 5" x 7½"

Vol. 121, Automobiles and Automobile Engines, 184 pp., 104 illus..$1.75
Vol. 122, Automobile Engine Auxiliaries—Carburetors, 120 pp., 56 illus. 1.25
Vol. 123, Forms of Carburetors, 120 pp., 41 illus..... 1.25
Vol. 124, Transmission and Control Mechanism, 112 pp., 81 illus.. 1.25
Vol. 125, Four-wheel Brakes, 166 pp., 61 illus..... 1.75
Vol. 126, Automobile Bearings and Lubrication, 174 pp., 83 illus... 1.75
Vol. 127, Automobile Tires and Vulcanization, 121 pp., 89 illus.... 1.25
Vol. 140, Overhauling of Automobile Engine Cylinders, 121 pp., 79 illus. 1.25
Vol. 141, Valve Adjustment and Repair, 81 pp., 52 illus..... 1.00
Vol. 142, Front End Drives—Cooling Equipment, 122 pages, 75 illus. 1.25
Vol. 143, Engine Troubles—Bearings and Shafts, 164 pp., 74 illus. 1.75
Vol. 144, Chassis Overhauling and Repairing, 240 pp., 73 illus..... 2.25

Partial list of other Blue Books

Aviation Engines ..... 4 vols.
Building Trades .....29 vols.
Drafting ..... 6 vols.
Electrical .....18 vols.
Radio Library ..... 5 vols.
Shop Practice (Eight Divisions).....49 vols.

Each volume is well made and bound in blue Spanish Morocco leather. All of them are semi-flexible, fit nicely into the hand and are convenient to use.

Examine books at our Booth No. 5, A. V. A. Convention New Orleans, La., Dec. 5-7, 1929.

International Textbook Co.

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☐ Please send me on approval your texts on the following subjects:
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I agree to return books if not adopted or to remit for same.
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(Continued from Page 44a)

miter crosscut gauge and parallel ripping fence, which increases the usefulness of the machine.

The machine is furnished with either belt or motor drive. The direct motor on the shaft drive assures silent, efficient, and effective operation, and greatest freedom from care. The belt-driven machine has a yoke with ball-bearing loose pulley, and belt-shifting mechanism.

The band saw is completely guarded; a hinged steel door covers the lower wheel, and two circular steel guards cover both sides of the upper wheel; a U-shaped steel guard incases the rear portion of the saw; and a U-shaped cast-iron guard, adjustable with the guide post, covers all the front portion of the saw not actually doing the cutting.

The special advantages claimed for the machine are less noise, greater efficiency, more simplicity, no gears, less parts, and greater durability.

MR. RAWLEY JOINS OLIVER COMPANY

The Oliver Machinery Company has announced the appointment of Mr. W. S. Rawley as their sales agent in Indiana and Kentucky. Mr. Rawley will have his headquarters at 776 Emerson St., Indianapolis, Ind.

DEATH OF MR. HIGGINS

Mr. Charles M. Higgins, pioneer ink manufacturer, died at his home in Brooklyn, N. Y., on October 22, after an illness of eight years. He was 75 years old.

Mr. Higgins was born in Ireland and came to the United States as a young boy. His invention of the famous Higgins drawing ink, laid the foundation for the large manufacturing business which he built up.

Mr. Higgins was a leader in the business and civic affairs of Brooklyn, and was one of the original members of local chamber of commerce. Failing health prompted him to retire about six years ago.

NEWS AND NOTES

Regional Conferences for Vocational Education

The Federal Board for Vocational Education has announced a series of regional conferences on vocational rehabilitation and vocational education, to be held in the fall and spring. The conference for the southern region will be held December 4 to 7, at New Orleans, La. The southern conference will be held in cooperation with the meeting of the American Vocational Association and will take the place of the usual sectional meetings on the program of the Association. The program for the early spring meetings is as follows:

North Atlantic Region — Agriculture, New York City or vicinity, week of March 10, 1930; home economics, New York City or vicinity, week of March 17, 1930; trade and industry, Boston, Mass., April 30–May 2, 1930.

Central Region — Home economics, Chicago, Ill., week of March 3, 1930; agriculture and trade industry, Chicago, Ill., week of March 24, 1930.

Southern Region — Trade and industry, New Orleans, La., December 4 and 5, 1929; Agriculture and home economics, Biloxi, Miss., week of April 7, 1930.

Pacific Region, Joint Conference — Agriculture, home economics, trade and industry, Phoenix, Ariz., week of May 19, 1930.

Substitute Vocational Schools for Ungraded Classes

Dr. Perry M. Lichtenstein, recently, before the Society of Medical Jurisprudence at the New York Academy of Medicine in New York City, made a strong plea for the substitution of vocational schools for ungraded classes. Dr. Lichtenstein, who placed the blame on the public-school system for the "mental cripples" who form 25 per cent of the prison population of New York state, declared that to wait until a crime is committed is too late to apply a remedy. He pointed

(Continued on Page 48a)

Three New Publications

One for drawing, one for architecture, furniture and tools and costumes, one concerning the job of every instructor — getting attention from the public who pays the bills.

ARTIST'S SCRAP BOOK

A collection of well over 1000 drawings and sketches. There are 104 plates, 9" x 12", and a 12-page brochure of instructions telling how to use the drawings in free hand drawing, in commercial art and in craft work. Mr. Lemos has shown in his instructions how to use the drawings on book ends and chests, etc.

Each of the 104 plates shows between 10 and 16 different illustrations. The sketches have been arranged by subject matter and a few of the subjects shown in the index are, Ships and Boats, Tree Silhouettes, Women's Activities, Plant Designs, American Pioneers, Monograms and Initials, and so on.

With these plates you will always have a ready reference to turn to when searching for new ideas whether it be in the drawing class or in the shop.

It seems a crime to repeat the phrase "must be seen to be appreciated" but it is absolute fact. We will be glad to send the book on approval if requested by any Industrial-Arts Subscriber.

Price $7.50

ART AGES

By PEDRO J. LEMOS

In one compact assembly, carefully arranged historically, Pedro J. Lemos has made these 40 plates into a library for every instructor. The 40 plates, 4 for each art period, cover architecture, architectural decoration and costumes, furniture, tools, instruments and weapons.

You can get ideas for changing the style of furniture made, you get suggestions by looking over the instruments and weapons which can be worked into iron and brass work, and the ornaments used in the architectural plates may be adapted and used in all manner of industrial arts.

With the 40 plates (10 in color showing the types of architecture), a folder is included which covers the history of each period for the 10 periods shown—Egyptian, Assyrian, Byzantine, Greek, Roman, Romanesque, Saracenic, Gothic, Renaissance and American Colonial —(some fine specimens of this last set).

Should be part of your library equipment—Plates are large enough for lecture work, size 10 x 14.

Price $4.75

SELLING ART TO THE COMMUNITY

By BEULA M. WADSWORTH

This book of 64 pages written with the art supervisor in mind applies just as well to every industrial art instructor. You have to sell your department and its work to the Superintendent, to instructors of other subjects, to the Board of Education and to the Public—the group that pays all the bills.

The days of Emerson's man making mouse traps in the woods is over. We have to bring the work of the industrial art department out before the people through newspapers, through the best publicity idea of all—the EXHIBIT, and we have to cooperate with all the other departments. The more people mention the work in your school, the more supplies and equipment will be OK'd on your requisitions.

How are you going to do it? Miss Wadsworth has studied it out and has used it. She tells how to get newspaper publicity, how to prepare articles for contributions to magazines and how to run exhibits and get displays. All these methods are practical—They have been used successfully. It certainly is worth the $1.50 — If you buy the book and don't get double the value of the price on the first reading, we'll gladly refund the money.

Price $1.50

The SCHOOL-ARTS MAGAZINE
404 PORTLAND ST., WORCESTER, MASS.

- ☐ Please send Artist's Scrap Book, 104 plates, 9" x 12" $7.50
- ☐ Art Ages, 40 plates, 4 for each art period, 10" x 14" $4.75
- ☐ Selling Art to the Community, 64 page book $1.50

Name . . . . . .

Address . . . . . .

SMOKERS' FITTINGS

WE CAN offer a real service. We have hundreds of items for the Manual Training Shop.

Our Fifteenth Annual Catalog shows the most complete line of "HARD-TO-GET" Materials in the country.

Our customers will be found wherever Manual Training is taught.

Have you seen our line of this hardware?

Catalog mailed free.

Thurston

Manual Training Supply Co.

Jobbers and Manufacturers

Anoka Minnesota

(Continued from Page 46a)

out that for the safety of the public, psychiatric examination of elementary and high-school children with proper segregation and care is of paramount importance. He said that a child who lags behind his classmates, becomes discouraged, loses his ambition, and becomes a truant, which is often the beginning of crime. Instead of placing such a pupil in an ungraded class, Dr. Lichtenstein would assign him to a vocational class. Such a student after graduation will take his proper place in society and will not become a burden on society.

Boatmaking at New Orleans, Louisiana

The manual-training department at New Orleans, La., is planning a boat contest on a large scale this year. The boats will be financed by the school board, and the proceeds of the sales will be returned to the school fund. A contest conducted last year proved so successful that it was decided to continue the project this year.

New Trade Courses at Madison, Wisconsin

The trade and industry department of the Madison Vocational School is offering courses for the benefit of several occupational groups. Among the new courses are barbering, welding for steam fitters, and drafting.

A Course for Vocational Instructors

A course in the writing of job sheets for vocational instructors is being offered at the Moline High School, Moline, Ill. Teachers of vocational work in Rock Island and Moline have enrolled for the work, which is divided between the two cities, part of the classes being conducted in the Rock Island Manual Arts Building and part in Moline.

Hold Exhibit of School Artwork at Baltimore, Maryland

A series of nine art exhibits, covering the educational accomplishments of the schools for the school year 1929–30, will be held at Baltimore, Md., under the direction of Mr. Leon L. Winslow, director of the arts department. The schedule of exhibits which opened on October 7, will continue to and including June 30. The exhibits are intended to make clear to the members of the department and to the parents of the pupils, the extent and value of the artwork offered in the schools. A city-wide exhibit of children's work has been planned to be displayed at the Baltimore Museum of Art.

Educational Film on Petroleum-Refining Industry

An educational motion-picture film, entitled "Refining the Crude," has been prepared, which shows the operations of the petroleum-refining industry in four reels. The opening scenes show general views of the modern oil-refining industry, while other scenes visualize the dependence of the world on refined petroleum products. A series of views illustrate how gasoline storage tanks are designed to reduce heavy evaporation losses. Copies of the film may be obtained by writing to the Pittsburgh Experiment Station of the U. S. Bureau of Mines, Pittsburgh, Pa.

Complete Analysis of the Electrical Trade in Oregon

An analysis of the electrical trade in Oregon has recently been made by Mr. O. D. Adams, state supervisor of trade and industrial education, for use in connection with the apprentice school in Portland. The analysis was made with the assistance of Mr. George Pettingell, Mr. C. W. Hays, and Mr. F. H. Murphy, all members of the Oregon Building Congress.

Cooperative Trade Training

Through the cooperation of the public schools and the automobile dealers' association of Detroit, Mich., a plan has been adopted, which provides for a cooperative course in trade training. Under the plan, training is given on an apprenticeship basis for boys who wish to qualify as expert automobile service mechanics. Applicants for the course must be 15 years of age, eighth-grade graduates, physically fit, and mechanically inclined. The course provides for one full year of preliminary training in full-time trade classes for automobile mechanics, one year of cooperative work in school and service alternately, and one year of part-time training for advanced service work. In the second year, the student is permitted to specialize in automotive electricity, carburetion, painting, and bumping, in addition to mechanical service.

Sturdily Constructed

Rockford Tools meet the FIVE requirements for school shop use—

Accepted by Industry
Sturdily Constructed
Simplicity of Control
Accurate
Economical

Operation by untrained hands imposes strains not met in the regular run of commercial work. But ROCKFORD "Economy" Lathes are built especially heavy to meet *unusually* severe industrial requirements and they can therefore be depended upon to take all the abuse that inexperiencd boys can give them.

As a typical example of ROCKFORD construction, consider the bed. It is of unusually deep cross section and is heavily braced at short intervals to eliminate vibration under the most extreme heavy duty. All gears within the headstock are cut from solid steel and are of large diameter and unusual breadth. This design together with the coarse pitch of their teeth and the fact that they run in a continuous bath of oil practically precludes the possibility of breakage, for it is impossible to lock these gears through carelessness. The carriage has an extra heavy and wide bridge permitting heavy cuts to be made without chatter. All stub shafts within the heavy apron have two bearings for rigidity and strength. All feeds are reversed in the apron and interlock with the bronze lead screw nut, making it impossible to engage the lead screw and feed shaft at the same time.

The ROCKFORD "Economy" Lathe is constructed throughout with a ruggedness uncommon in a fine precision tool. It is built to "take it and come up smiling." It's a lathe your boys will not wear out for many a year. We invite your correspondence.

ROCKFORD
MACHINE TOOL CO
ROCKFORD - - - - - ILLINOIS

THE VISE THAT SLIDES

RAPID ACTION · SAVES TIME

Just give this handle a quarter turn and the moving jaw will slide back and forth the full length of the guide rod, wherever you want to set it. Another simple turn of the handle instantly locks the jaw firmly and rigidly. No endless turning! A great convenience! A remarkable time-saver!

This exclusive two-piece cam operated nut makes possible instant adjustment of the vise to accommodate any size object, *without turning and turning the handle.*

This R-W Rapid Acting Vise is an exclusive and original Richards-Wilcox development. The men who designed it are responsible for the largest and most complete line of fine hardware in America.

Send today for R-W catalog.

Richards-Wilcox Mfg. Co.

A Hanger for any Door that Slides

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Boston Philadelphia Cleveland Cincinnati Indianapolis St. Louis New Orleans Des Moines Minneapolis Kansas City Atlanta Los Angeles San Francisco Omaha Seattle Detroit

Montreal · RICHARDS-WILCOX CANADIAN CO., LTD., LONDON, ONT. · Winnipeg

How to File Circular Saws

Told by the World's Foremost Makers of Saws

DISSTON Circular Saws, and all other Disston Saws, are made of Disston Steel, from Disston's own steel furnaces. The cutting qualities of this steel, and the skill of Disston craftsmen, made Disston the world's foremost saw makers.

You want Disston Steel in your circular saw. There is no substitute for it. This steel takes and *holds* a keener cutting edge; cuts easier, and stays sharp longer. In great lumber mills, Disston Circular Saws are standard equipment. You will find that you, too, can do better work if you use only Disston Saws in your home workshop.

Ask for Disston! Circular Saws and Band Saws, Hand Saws, Hack Saws, and, of course, Disston Files.

Files for the Wood Worker

Disston Cabinet Files (fine teeth) for smoothing and finishing wood surfaces, easing tight doors and drawers, etc. Disston Wood Rasps (coarse teeth) for rough and fast cutting, enlarging holes, etc.

A Disston Circular Saw on a Portable Bench Machine

"The Saw Most Carpenters Use"

Disston Hand Saws always have been standard in school shops. The D-8, skew back, and the D-16, straight back, are favorites with instructors everywhere, in teaching better sawing.

Handiest of Pocket Levels

For truing up construction work, leveling shelves, jointer tables, etc., use a Disston Featherweight Pocket Level. Lightest and handiest level made. Length, 9"; weight, 2 oz. Aeroplane aluminum. Three proved glasses.

TO sharpen small circular saws, you need a filing clamp or vise; the proper files, and a saw set, or an anvil and hammer, to spring the teeth. The Disston No. 7 Circular Saw Filing Vise is handiest, taking saws from 4" to 16". On cross-cut and combination saws, use Disston Taper Files, 6" or 7"; on circular rip saws use Disston Mill Files, 6" or 7", with one round edge.

First joint the saw, getting all teeth same length. Do this by turning saw backward by hand on mandrel, holding emery stone lightly against tops of teeth until all are touched.

Then put saw in vise and set the teeth, using a Disston No. 18 Triumph Saw Set. Be careful not to carry the set down too far on the teeth. Follow the original set of your saw. One tooth is set to right and next to left.

Next file the teeth as near to their original shape as possible. Keep all gullets of same depth and width. Bevel teeth alternately, following original angles. In filing, do not reduce length of teeth: simply bring them up to a sharp point. Bevel on both face and back should be about one-third the length of the teeth.

No teeth of a hollow-ground combination saw should be set. Do not bevel raker or cleaner teeth, but file them straight through.

Your hardware dealer has in stock, or can get for you quickly, Disston Circular Saws for any machine.

Band Saws for Better Work

Disston "Thin Gauge" Narrow Band Saws are 2 to 3 gauges thinner. They run better on machines with wheels up to 24" diameter. On larger machines, use Disston regular-gauge band saws.

For Cutting Dovetails, etc.

Wherever a fine joint is needed, and for careful cabinet work or pattern making, use a Disston No. 68 Dovetail Saw. Blade extra thin, with fine teeth. The 8" blade, 17 points to the inch, is most popular.

For Smooth Cutting

The Disston Smooth-Cutter Combination Saw makes a perfectly smooth cut which requires no planing, sanding or dressing before gluing. It cross-cuts, rips and miters.

DISSTON

***Makers of* "THE SAW MOST CARPENTERS USE"**

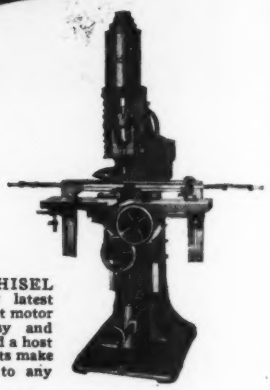
"Disston Small Circular Saws and How to Use Them" is a new bulletin which tells how to operate and refit saws. It will be of interest and value to every woodshop instructor. The coupon will bring it to you.

Henry Disston & Sons, Inc., Philadelphia, U. S. A. (Ed. Dept.)
(In Canada, address Henry Disston & Sons, Ltd., Toronto)
Please send Bulletin on Circular Saws and other helpful data.

Name and Address.....

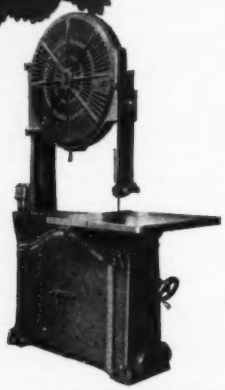
The Complete Yates

Surfacers, Band Scroll Saws, Tool and Knife Grinders, Buzz Planers, Tenoners, Carving Machines, Lathes, Rip Saw Benches, Band Saws, Cut-Off Saws, Shapers, Boring Machines, Jointers, Mortisers, Miter Machines, Universal Saw Benches, Saw Filing and Setting Machines.

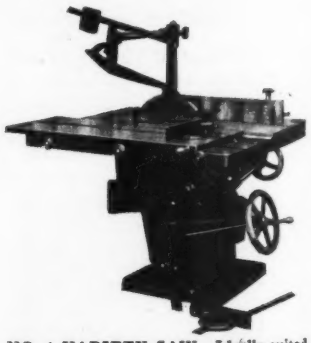


TYPE K-25 HOLLOW CHISEL MORTISER. The very latest machine of its type. Direct motor driven, ball bearing, easy and convenient adjustments and a host of other major improvements make this a desirable addition to any school shop.

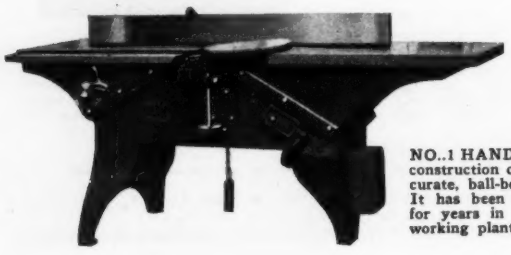
NO. 12 SPEED LATHE. Always a popular lathe in school and pattern shops. It is durable, easily operated and safe. Made in various sizes and equipped with drives to meet any requirement.



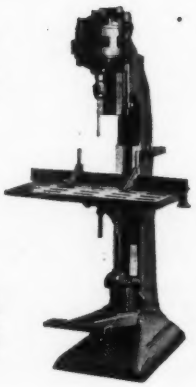
Y-36 BAND SAW. A High Speed machine of super-excellent quality, built in 30" and 36" sizes. Designed for durability and long life, meeting the school shop demand perfectly.



NO. 1 VARIETY SAW. Ideally suited to the host of straight and angular cuts required in the manual training shop. Durable, accurate, and amply guarded. Available in several drives.

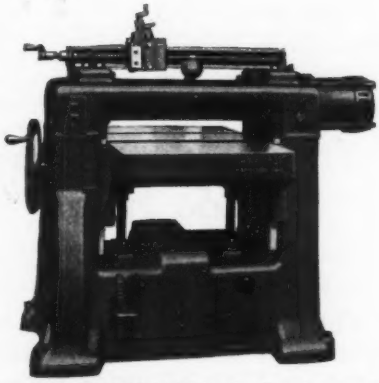


NO. 1 HAND JOINTER Rigid construction characterizes this accurate, ball-bearing hand jointer. It has been a popular machine for years in all types of woodworking plants.



TYPE U-21 SINGLE BORER. A light, wide range machine built for miscellaneous duty. The machine shown is direct motor driven with convenient push button control. All belts and gears are eliminated.

American Line of recognized woodworking machinery



B-4 SINGLE SURFACER. Small and compact, yet built exceedingly heavy for its size, the B-4 has been designed particularly for schools and small shops. All running parts are fully enclosed. This machine produces beautiful work and will stand the abuses of constant operation. Direct motor driven machine is illustrated.

THE fact that Yates-American equipment is universally recognized as superior by the woodworking industry should be an endorsement of great consequence to the school shop supervisor and instructor.

For the industry's demands are rigid and schools pattern their program after industry. Durability and long life, under the pressure of constant day-after-day performance, combined with safety, simplicity of operation and fine work, are the features which schools and the industry alike require.

Furthermore, the completeness of the Yates-American line enables this company to supply every school shop need, with the additional advantages of skilled engineering and planning service and a thorough knowledge of school equipment problems.

Visit booths 49-50 at the New Orleans convention and inspect this recognized line of woodworking machinery.

Visit Booths 49-50 at the New Orleans Convention

YATES-AMERICAN MACHINE COMPANY
BELOIT, WISCONSIN

CHRISTMAS GIFT *specials*

Always the most fascinating opportunity of the year—the Christmas Gift project—and here is an offer that is unusually attractive: Colonial Metal Lamps in both floor and table models; ready to assemble and finish.

LOW PRICES An unusually advantageous purchase enables us to sell the parts for these lamps at prices that are far below the real value. Students can afford to make surprise gifts for their homes our of spare time money they can earn—or they can sell the finished lamps at a profit.

Bargain Set A-10—Colonial Bridge Lamp—includes three leg castings and weight, lower column casting, arm casting with thumb screws, top casting and finial, brass lamp bowl and spinning, knob, candle socket (for electric light) with drip casing, 15 feet of brown silk lamp cord and one 2-piece attachment plug. May also be had in Set C-30 with parts for regular cluster type junior floor lamp, including No. 842 Benjamin, two-light pull chain cluster, three feet of ornamental tubing, in addition to other parts mentioned for Set A-10. Shipping charges extra. Weight 15 lbs. per set. Price for either set complete without pipe, only **$2.70**

Bargain Set B-20—Colonial Table Lamp—includes base casting in imitation of candle holder, adjustable arm casting with thumb screws, candle bobeche, knob, cup, and drip socket with pull chain, top finial casting, 15 feet of brown silk lamp cord and one 2-piece attachment plug. Shipping charges extra. Weight, per set, 8 lbs. Price complete without pipe, only **$1.85**

Order at Once!

Immediate Delivery.

Make up an order for these attractive sets. All shipments sent C.O.D. unless accompanied by check or sent through the school. Write or use the handy coupon. At the same time, or even if you don't order these sets, ask for illustrated matter on our other supplies, including more lamps, book ends, smoking stands, curtain rods, hand hammered angle iron, lumber, etc.

Ask for illustrated literature on other materials

MIDWEST LUMBER CO.

Dept. A Appleton, Wis.

MIDWEST LUMBER CO., Dept. A, Appleton, Wis.

Send following materials at once by (Parcel Post—up to weight limits), (Express), (Freight). Quantities as indicated.

.....Sets A-10 Colonial Bridge Lamps.
.....Sets C-30 Colonial Junior Floor Lamps.
.....Sets B-20 Colonial Table Lamps.

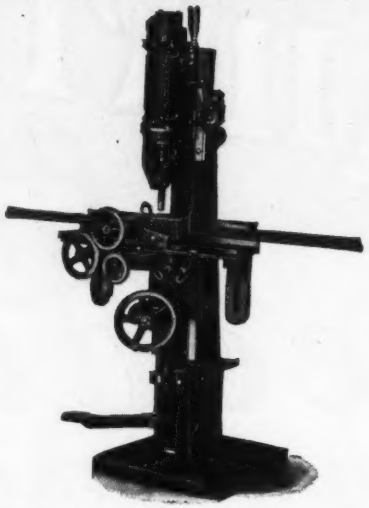
☐ Free illustrated literature on complete line.

Name.....

School.....

City..... State.....

MORTORIZED HOLLOW CHISEL MORTISER No. 208



Bulletin IA-15 sent on request

HALL & BROWN WOOD WORKING MACHINE CO.

1913-33 N. Broadway

Saint Louis, Mo.

Huthers Bros. Dado Head

You need a Huther Dado Head

The saw that makes intricate cutting and grooving simple.

This saw, developed from our own patents, consists of two outside cutters and a sufficient quantity of inside ones to perform the required cut. The outside cutters can be used singly or in pairs as required.

Every builder or contractor, wishing lock corners or any sort of grooving, will find his production costs lowered by this saw.

Write for complete information and prices, or send for one on approval. It may be returned at our expense if unsatisfactory.

Huther Bros. Hollow Ground Saw

HUTHER BROS. SAW MANUFACTURING COMPANY

Rochester, N. Y.

Makers of Better Saws for More Than 50 Years.

Building Better Students and Worthier Citizens in Kansas City Schools

VOCATIONAL training and practical arts have won a recognized place in modern education. The old fashioned thought in education was to stress the academic and cultural courses of language, history and science in the abstract. But educators today, while not losing sight of the value of academic courses, realize that the first requirement of an education is to equip the student to meet life. As far as possible, they want students to step from their classes into the business of living as naturally as possible. They want to eliminate the "shock years"—when the student must re-adjust his school-learned knowledge to the world as it really is.

The device that bridges the gap between the academic and the practical—is the shop. And educators find that this is more than a mere bridge. Shop courses serve as an incentive to students. Young boys, fairly overflowing with life and energy, require an outlet that is not afforded by the academic courses. Actual school records show that scholastic standings in academic courses have been raised with the introduction of shop courses.

In the Public Schools of Kansas City, as in many other cities — students are thrilled by the whir of Wallace Woodworking Machinery. They are delighted with the keen cutting band saw, the tilting arbor circular saw, the smooth cutting jointer, the lathe and other Wallace Machines that convert raw lumber into countless useful articles for the delight and instruction of tomorrow's citizens. In Wallace Machines, there is safety—each machine being thoroughly guarded. And they are not big mill machines, they are cabinet shop machines which boys may operate with ease and convenience.

Mr. O. H. Day, Director of Vocational Education and Practical Arts of the Kansas City Public Schools, writes:

"We have been using Wallace Woodworking Machines in our schools for the past four years and find them to be satisfactory. We find them particularly adaptable to schools. They are very well constructed and do excellent work.

"We also wish to express our appreciation of the quality of the service rendered us and the help that we have had in learning the details of the construction of these machines."

Other School Directors everywhere, are equally enthusiastic about Wallace Machines. Investigate them now!

[See Wallace Machines in operation at the A. V. A. Convention at New Orleans, Booths 11 and 12]

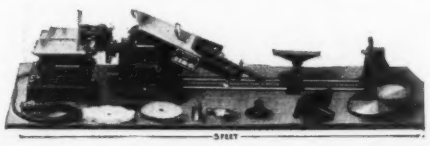
An Opportunity *for* Instructors

Instructors who are anxious to add to their income and at the same time aid in the vocational development of their students should get particulars on the Workace Woodworker. Be our sales representative for this complete electric woodworker. Your students can install it at home. The Workace includes a 4" Planer, 8" Circular Saw, 6"x36" Lathe, 8" Disc Sander, 6" Buffing Wheel, 5" Emery Grinder, ¼" Drill Chuck and a G. E. Motor that operates from the electric light socket. Sells for only $89.00 — and easy terms if desired. A real money making opportunity for you. Send coupon for particulars.

$9.00 DOWN

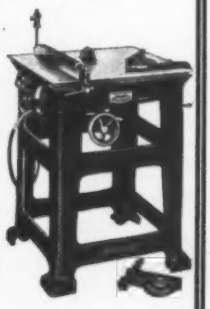
$89.00 COMPLETE

J. D. WALLACE & CO.
140 S. California Ave.
CHICAGO - - - ILLINOIS

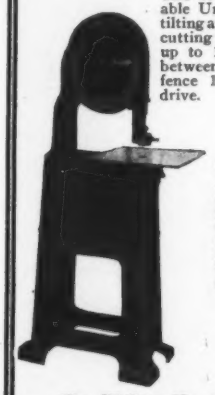


Safe Instruction

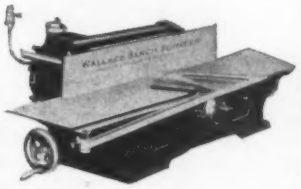
Students stand naturally as they work at Wallace Machines. There is no strain. Wallace Machines are used in industry —more than 40,000 are at work establishing new records of speed, efficiency and accuracy. Yet they are not big, cumbersome mill equipment. They are cabinet making machines that fit school woodworking needs. Portable and driven direct from the electric light socket. Send the coupon for complete catalog.



The Wallace No. 8 Portable Universal Saw has a tilting arbor. Will do heavy cutting up to 2¼", dado up to 1" wide. Capacity between blade and cut off fence 12". Direct motor drive.



The dynamic balancing of the WALLACE Band Saw together with the accuracy of the table assures quick and perfect cutting to the line of the finest of band sawing. Is sufficiently powered to handle heavy stock up to 8" thick. Sixteen inches can be handled between the blade and frame; unlimited capacity right of blade.



The Wallace No. 10 Portable 8" Jointer cuts 8" wide, rabbets or bevel cuts ¾" deep. Direct motor drive. Four high speed steel knives.

J. D. WALLACE & CO.
140 S. California Ave.
CHICAGO - - - ILLINOIS

J. D. Wallace & Co.
140 S. California Ave.
Chicago, Ill.

Please send us your complete catalog describing Wallace Woodworking Machines for school woodshops.

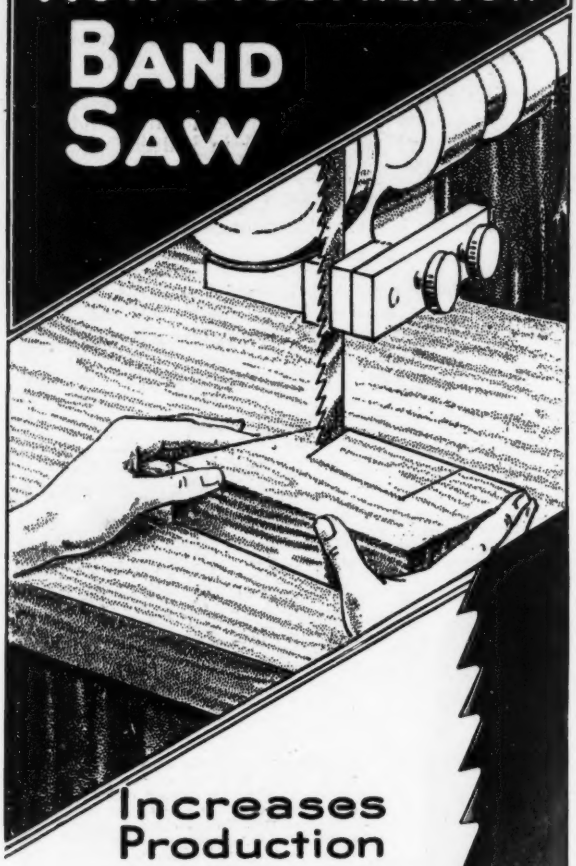
Name.....

Address.....

City..... State.....

☐ I would like to be a Workace Sales Representative.

It's a SIMONDS New Steel narrow BAND SAW



Increases Production

Reduces Fitting cost 30%

Made of SIMONDS own ALLOY-STEEL and hardened and tempered in the same careful manner as the world known SIMONDS WIDE BAND SAWS, the new steel SIMONDS NARROW BAND is the most efficient saw of the type that has ever been offered the woodworking industry. At least two years before these saws were offered the trade SIMONDS proved out its efforts to produce the world's finest NARROW BAND SAW—a saw that while increasing production 10 to 20 per cent decreases the filing costs 30 per cent over the usual band saw blade. It is new—more efficient and has greater edge-holding qualities.

Try one of these new saws.

SIMONDS SAW AND STEEL COMPANY
"The Saw Makers"
ESTABLISHED 1832—FITCHBURG, MASS.

Chicago, Ill.	Lockport, N. Y.	Portland, Ore.	Montreal, Que.
Boston, Mass.	Memphis, Tenn.	San Francisco, Cal.	Toronto, Ont.
Detroit, Mich.	Atlanta, Ga.	Los Angeles, Cal.	Vancouver, B. C.
New York City	London, England	Seattle, Wash.	St. John, N. B.
New Orleans, La.			

The No. 10 Crescent Saw Table is a sturdy, substantial machine with every convenient adjustment for general factory work and will meet every requirement for a practical saw table with self-contained motor for your manual training department.

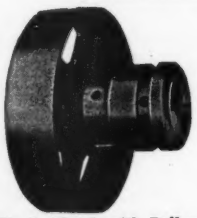
Send today for circular giving complete description. Also ask for circular of band saws, saw tables, shapers, jointers, variety wood workers, planers and matchers, disk grinders, cut off table, swing saws, borers, hollow chisel mortiser, tenoner, universal wood workers, self-feed rip saw.

THE CRESCENT MACHINE CO.
25 Main St.,
LEETONIA, OHIO.

THE JOHNSON FRICTION CLUTCH

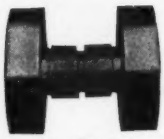
SCHOOL OFFICIALS!

Here Is the Well Known
JOHNSON CLUTCH
Used In Schools and Universities
THROUGHOUT AMERICA

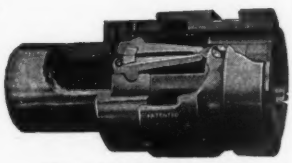


Single Clutch with Pulley

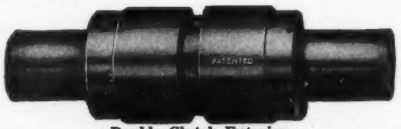
Single Clutch Exterior



Double Clutch with Pulleys



Single Clutch Broken Away



Double Clutch Exterior

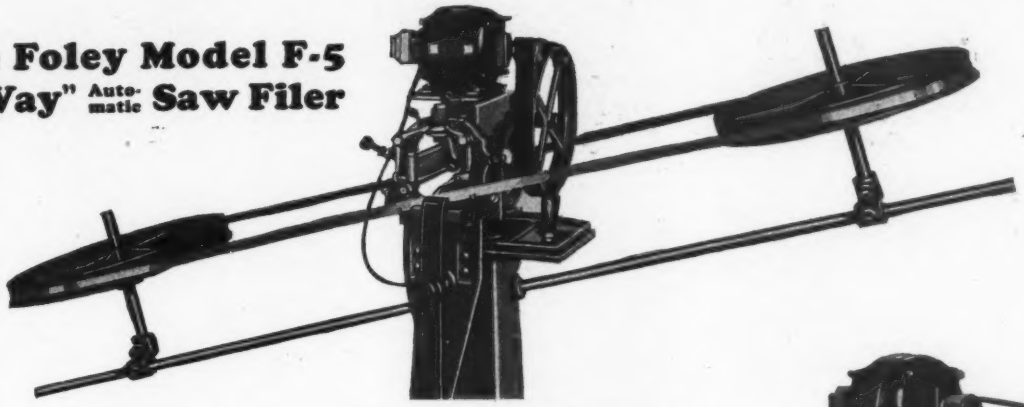
WRITE for CATALOG "I.A.M.-12"

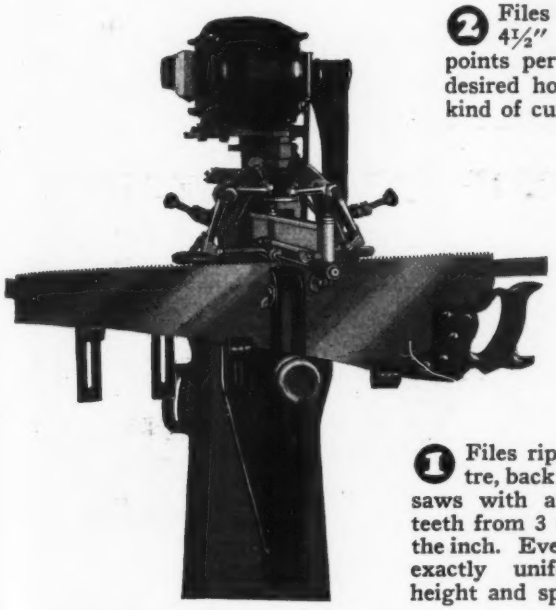
THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

One Machine Files All Kinds of Saws

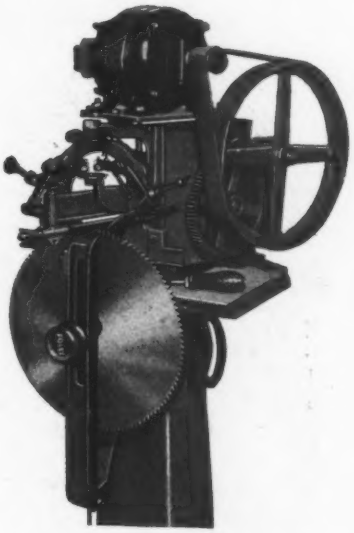
The Foley Model F-5 "3-Way" Automatic Saw Filers will sharpen all hand, band and circular saws that can be filed with a 3-cornered file. It solves the vexing problem of keeping all your saws constantly in A-1 condition. Saves your time, and makes saws last longer. Much better and quicker than hand filing, and eliminates all eye-strain.

The Foley Model F-5 "3-Way" Automatic Saw Filer





2 Files band saws 1/8" to 4 1/2" wide from 3 to 16 points per inch. Puts on any desired hook or pitch for any kind of cutting.



1 Files rip, cross-cut, mitre, back and other hand saws with any number of teeth from 3 to 16 points to the inch. Every tooth is filed exactly uniform in size, height and spacing.

3 Files cross-cut circular saws from 3" to 24" in diameter, from 3 to 16 points per inch. Gives any desired bevel. Keeps saws in perfect circle.

The Foley Model F-5 "3-Way" Automatic Saw Filer and other Foley Products will be exhibited at the American Vocational Association Convention, Hotel Roosevelt, New Orleans, Dec. 5th to 7th. Be sure to see them if you attend.

Hundreds of manual training schools and departments are using the Foley Filer and would not be without it. Write for our booklet, "As Necessary As Your Saws," containing complete information.

Foley Manufacturing Co., 25 Main St. N. E., Minneapolis, Minn.

CLAMPS

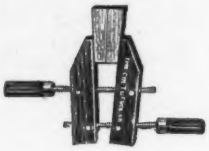
HUMBLE TOOLS OF INDUSTRY

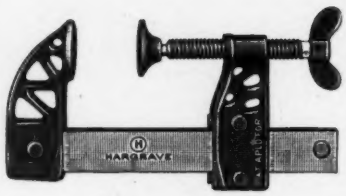
Since 1879

HARGRAVE CLAMPS have played an obscure but important part in American industrial development. Few tools indeed can boast a record as impressive.

Fifty years ago HARGRAVE CLAMPS were designed and constructed to be the finest clamps on the market. Since then a steady process of refinement and improvement has increased their supremacy until today they are universally recognized by both craftsmen and production engineers as without rival.

The Cincinnati Line of Hargrave Clamps is complete and includes improved designs of every clamp used in woodworking or machine shop.



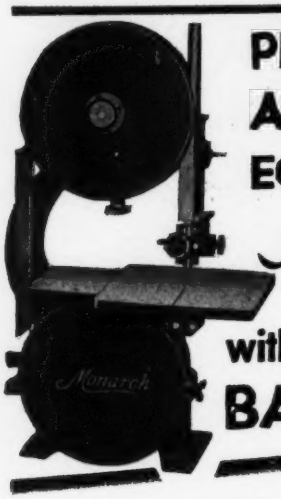


Write for a complete catalog

Ask your jobber for HARGRAVE QUALITY TOOLS

The Cincinnati Tool Co.

Waverly and Main Aves., Cincinnati, Ohio



PRECISION ACCURACY ECONOMY.. *Yours* with this BENCH BAND SAW!

Guaranteed for long hard service, this Bench Band Saw will handle the most delicate patterns with ease. 12" and 16" size. Completely enclosed. Built-in motor operates from lighting current. Handy—Husky—Adaptable . . . a money-maker and a necessity for the modern shop!

WRITE FOR BULLETINS

Special bulletins on band saws, mortisers, planers, jointers, variety wood workers, hoists, saw tables and saw mills are yours for the asking. Write for them!

AMERICAN SAW MILL MACHINERY CO.

74 Main Street, Hackettstown, N. J.

KEYSTONE

Industry draws constantly on the country's manual training schools for new recruits. It is therefore evident that the pupil be trained to the use of tools in general industrial use, and this is the reason why manual training schools for years have used "Cleveland" Grindstones to fit students for actual industrial work. A distinct compliment to the worth of "Cleveland Grindstones."

THE CLEVELAND QUARRIES COMPANY

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CLEVELAND, OHIO

THE PEASE "JUNIOR" BLUE-PRINTING EQUIPMENT

Facts About The "Junior"

PRINTER

(1) Will make perfectly finished prints any size up to 24 x 36 in.
(2) Prints in from 1 to 1½ minutes with one drop of the lamp.
(3) Requires no special electrical connections—can be connected into the lighting circuit.
(4) Prints on either 220 or 110 volts AC or DC.
(5) Patented oil control regulates printing speed.
(6) Requires floor space of only 25 x 26 inches.
(7) Framework olive green—aluminum lamp reflector, satin finished.
(8) Shipped completely set up.

SHEET WASHER

(1) Specially designed for use with "Junior" Printer.
(2) Washes prints better—dries them quicker.
(3) Dispenses with dripping prints, open trays of water and wet floors.
(4) Requires floor space of only 24 x 34 inches.
(5) Potash tray, and brush and drying rack (see illustration) furnished free with each washer.
(6) Entire washer enameled olive green.

Ask for Special School Catalog MJ-02X

STUDENTS MAKE RECORD BREAKING PROGRESS!

Learn How to Make and Read Blue-Prints Rapidly

WITH the Pease "Junior" Blue-Printing Machine and Sheet Washer you can teach students "The Art of Making Blue-Prints" right along with their studies. The Pease "Junior" has real classroom value and is a special School Model Blue-Printing Equipment.

Initial investment is small . . . operating expense is reduced to a minimum, and complete equipment can be stood in a corner of the school drafting room.

Ask for Special School Catalog SJ-02X and Complete List of "Junior" Installations

THE C. F. PEASE COMPANY
802 North Franklin St., Chicago, Illinois

PEASE
BLUE PRINTING MACHINERY

"Clear away the cobwebs"

Dictionary of Technical Terms

By F. S. Crispin

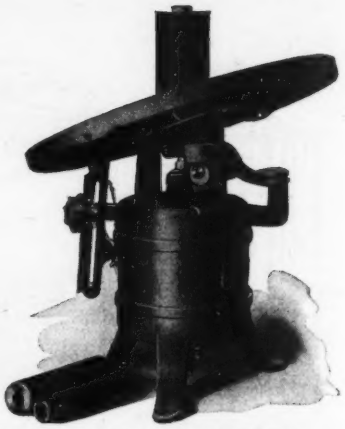
Prepared especially for the school shop, it defines in simple language the commonly used words in the leading mechanical occupations. Each definition is applied to school use and has been written to be understood by the boy who is entirely unfamiliar with trade terminology.

Confusion in the school use of technical and trade terms will be avoided through the use of DICTIONARY OF TECHNICAL TERMS. Give a student a job in woodworking, for instance, that involves tools with which he is not familiar. With the aid of the Dictionary, he is at once given an understanding of the tools used with the least possible delay. *Price, $1.25.*

Can your classes afford to be without it? Write Dept. I.A.M.12 for a copy on approval.

The Bruce Publishing Company
Milwaukee Wis.

A handy bench sander for school shops- - - -



This new inexpensive Porter-Cable Oscillating Spindle Bench Sander will save hours of sanding operations in your shop. It is ideal for teaching students how to do curved, irregular and angular work.

It has an oscillating movement that makes use of all the abrasive, eliminating sandmarks. Can be tilted at angles of 15° up and 20° down. Weighs only 55 lbs. and can be easily placed where most convenient.

Ask about this sturdy bench sander as well as our complete line of Belt, Spindle and Disc Sanders for school shops.

PORTER-CABLE Sanders are the most widely used in the World.

See our exhibit at the A. V. A. Convention in New Orleans.

THE PORTER-CABLE MACHINE CO.
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Does Your Shop Equipment Include a Shaper?

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Band Saws
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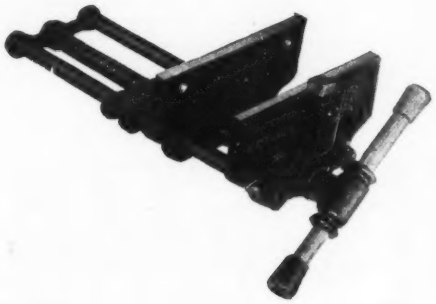
The NEW

Toles SPASAVER Bench

with the old reliable

Toles Vise

make a combination hard to beat



When a product has been used in school shops throughout the country for more than a quarter century — When its basic design has remained unchanged in that time—When it has been imitated on every side—And when it is today regarded in higher favor than ever before **—THAT product MUST be good.**

In quality of workmanship, in materials, in design and finish, the famous Toles Vise is as superior as in fundamental principle. There is no vise today that can equal it in performance and certainly no vise that can equal its economy — **for a GENUINE Toles Vise costs no more than an imitation.**

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Toles SPASAVER Benches are real space savers. In addition they provide for growth of shop classes in the most natural manner.

Each individual Toles SPASAVER Bench normally accommodates one boy. Two benches bolted together, however, accommodate **four** boys and provide ample, unrestricted working space for each. Thus, as classes grow, or in cases where conditions require economy of space, the Toles SPASAVER provides flexibility and capacity otherwise unobtainable.

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No more pastes

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A class supplied with Kester Solder has no need for separate fluxes. Kester requires only heat, and supplies its own flux in exactly the right quantity. The flux is in a core in the solder, just like lead in a pencil.

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Sold by jobbers and dealers everywhere.
Instructors: Try Kester in your class work. The coupon will bring a liberal sample for every boy in your class.

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Gentlemen: Please send the following number of working samples:

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The number of boys in our class is:
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Signed.....
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Instant clutch control with hand lever or foot treadle.
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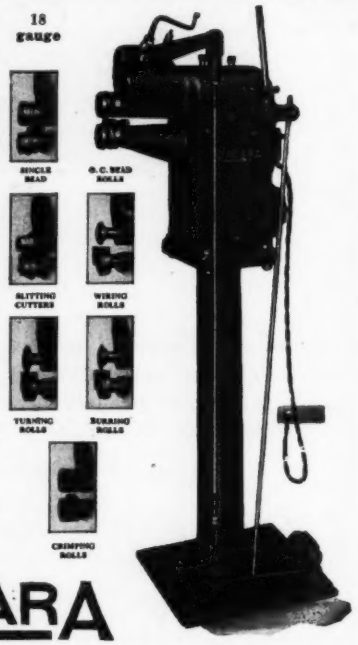

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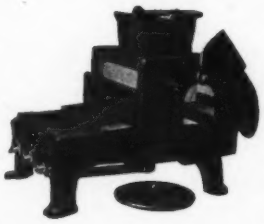

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Mortiser is equipped with compound table permitting wide range of work. Built-in motor eliminates all belting—an added safety feature. Convertible in less than five minutes into a first-class boring machine using one-fourth to one inch bit. The Brackett Mortiser has many other desirable features to recommend it as a part of the equipment you should have in your shop.

Correctly Sharpened Tools Sharpen Wits and Encourage Hands

The **Efficiency Grinder**

Grinder is entirely self-contained. Bronze bearings and gears are automatically lubricated — simply refill with good lubricating oil once a year. Direct connected Westinghouse motor, any phase, any cycle, or D. C.—state power requirements. Especially designed for giving a razor edge to all edge tools and for woodworking tools particularly. Rough and fine 8" x 2" Norton wheels, individual tool rests and grinding gauge included. Cone wheel extra when desired.

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Madison Wisconsin

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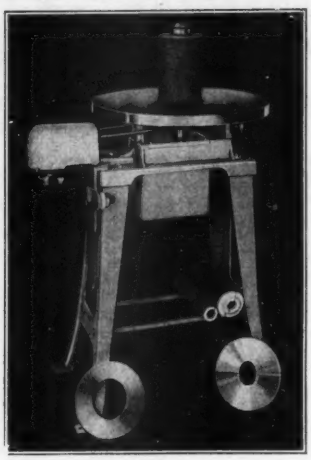

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4 Moving Parts Mechanism
Runs in Oil
No Grease Cups
Vibrationless

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Send for interesting literature describing these remarkable new machines.

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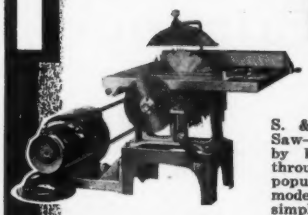

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A Complete Workshop

Accurate . . Safe . . Rugged

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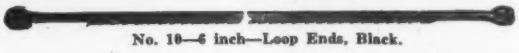
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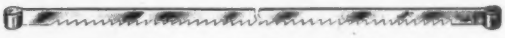
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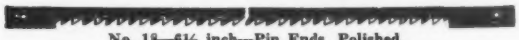
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Saws with teeth "Set" properly will cut Faster and Easier and will not bind, thus lessening breakage.

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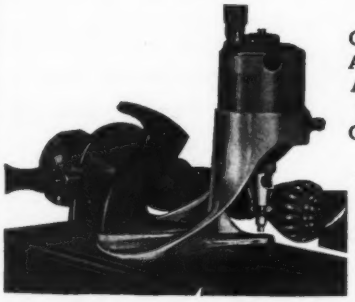

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110 or 220 Volts

If after a 30 day tryout you are not convinced that this is the most efficient, handiest glue pot you ever had, send it back.

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Test this modern pot in your own shop.

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Bay	Pine (white)
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Birch	Plain red oak
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Buckeye	Plain white oak
Butternut	Plywoods
Cedar	Poplar
Cherry	Quar. red gum
Chestnut	Quar. red oak
Cottonwood	Quar. sap gum
Cypress	Quar. white oak
Elm	Redwood
Hackberry	Sassafras
Hemlock	Spruce
Hickory	Sycamore
Laurel	Tamarack
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Your students will really *enjoy* working with Algoma Plywood. It enables them to plan, build and finish furniture that has beauty as well as usefulness. The results are truly gratifying . . . and reflect most favorably on both student and instructor.

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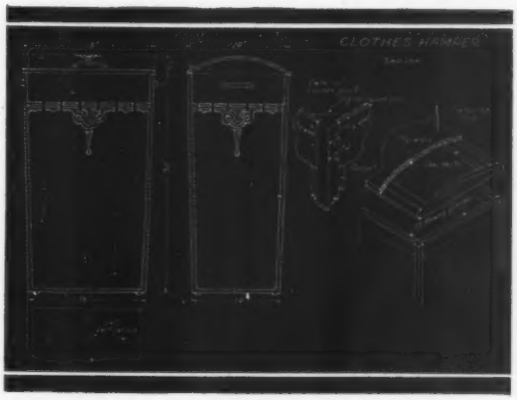

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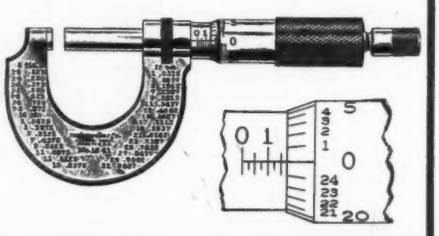

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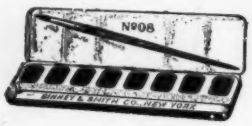

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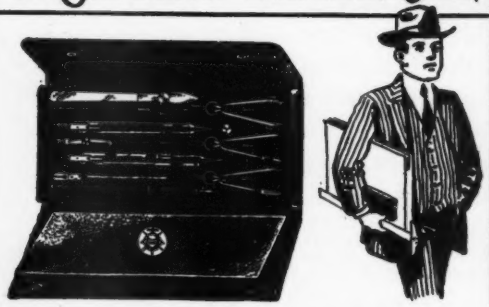

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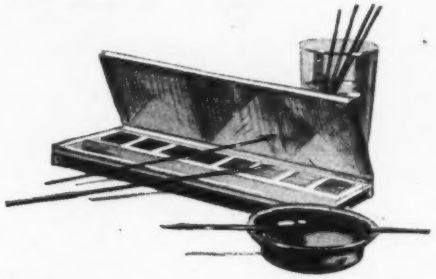

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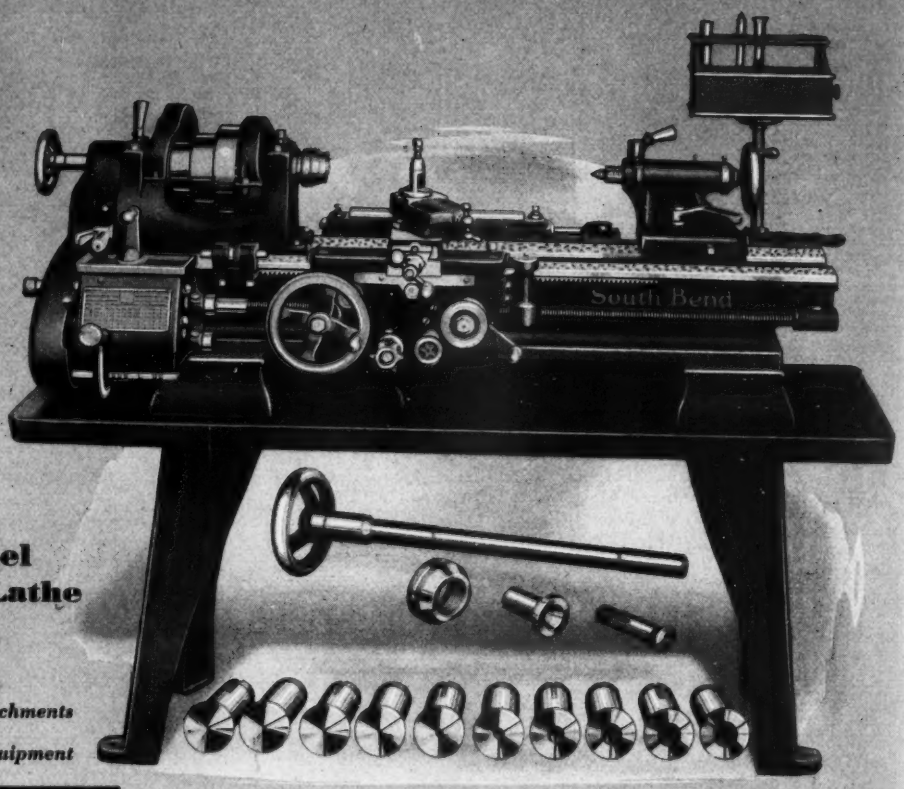

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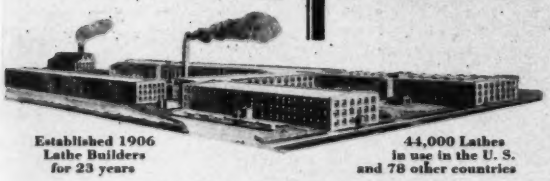

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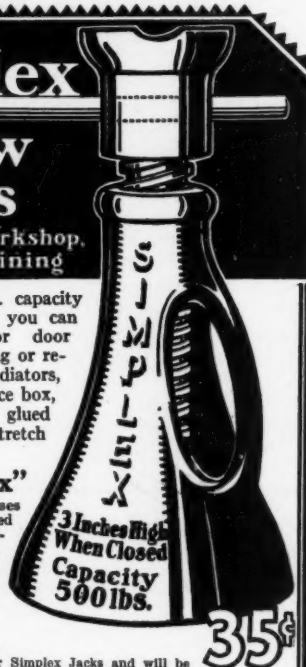

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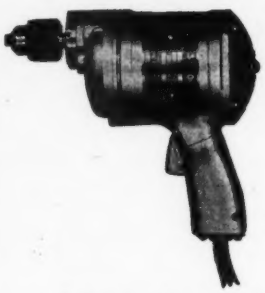

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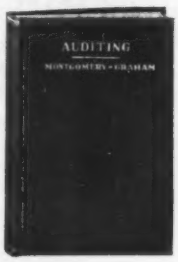

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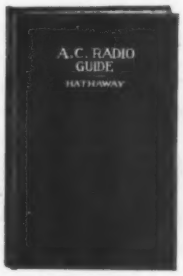

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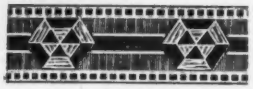

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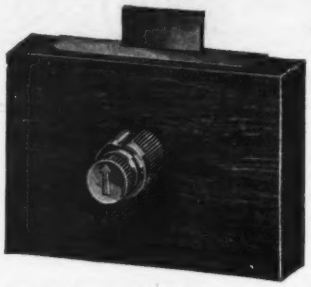

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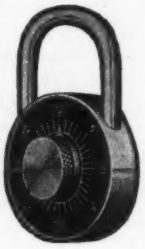

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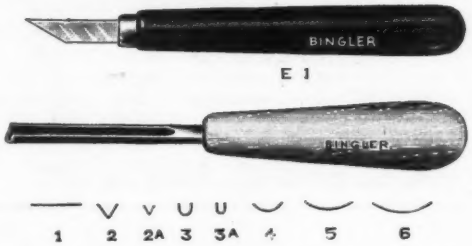

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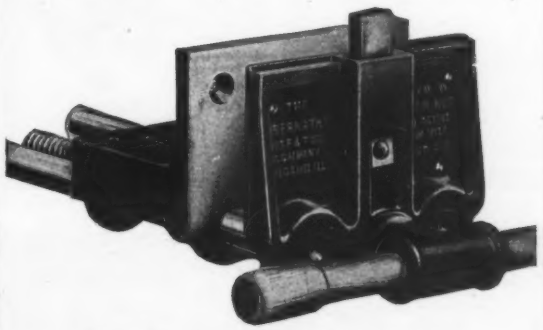

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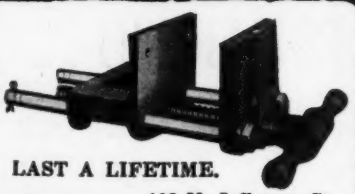

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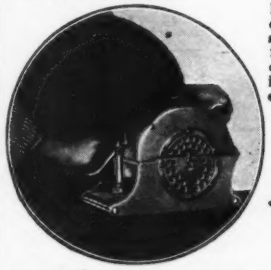

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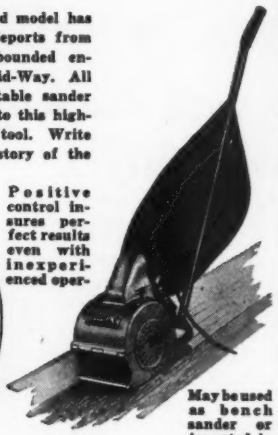

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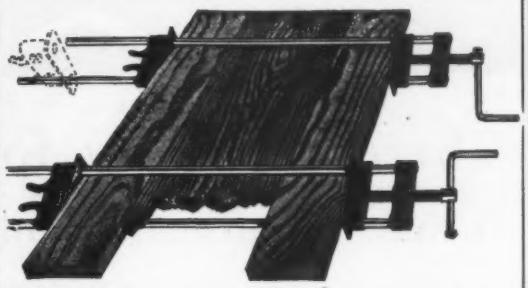

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Stanley Rule & Level Plant, The

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Oliver Machinery Co.
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Yates-American Machine Co.

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Porter-Cable Machine Company
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Foley Saw Tool Company

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Starrett Company, L. S.

SCREW & LEVER JACKS
Templeton, Kenly & Co., Ltd.

SEWING TABLES
Christiansen, C.
Kewaunee Mfg. Company
Welch Mfg Co., W. M.

SHAPERS—METALWORKING
Cincinnati Shaper Co., The
Rockford Machine Tool Co.

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American Saw Mill Mchy. Co.
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Johnson & Sons, S. C.

TAPS AND DIES
Morse Twist Drill & Machine Co.

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Atkins & Company, E. C.
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Abernathy Vise & Tool Co.
Atkins & Co., E. C.
Bemis, A. L.
Christiansen, C.
Columbian Vise & Mfg. Co., The
Millers Falls Company
Morgan Vise Company
North Bros. Mfg. Company
Oliver Machinery Company
Richards-Wilcox Mfg. Co.
Stanley Rule & Level Plant, The
Toles Company, W. C.

WATER COLORS
American Crayon Company
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American Crayon Company
Binney & Smith Company
Bradley Company, Milton
Dixon Crucible Company, Jos.

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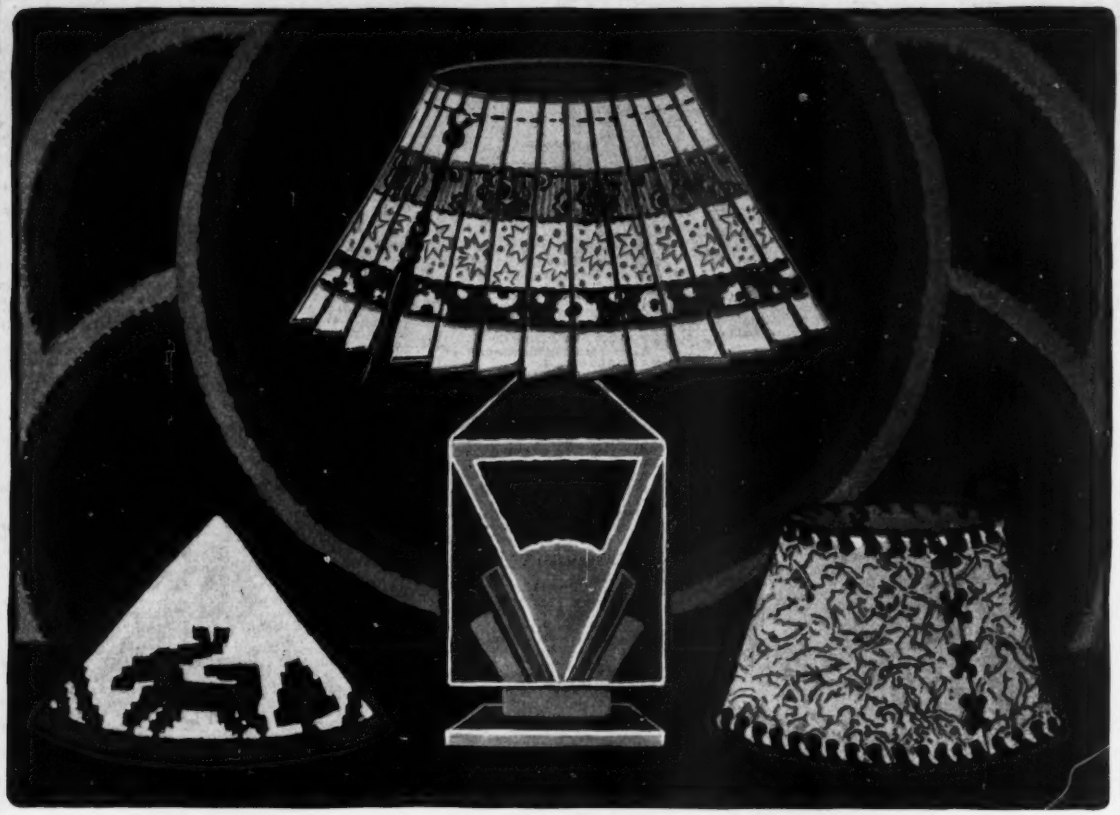
WOODWORKERS' CLAMPS
Cincinnati Tool Company

WRENCHES
Cincinnati Tool Company
North Bros. Mfg. Company
Peck, Stow & Wilcox Company

ADVERTISERS REFERENCE INDEX

Abernathy Vise & Tool Co....51a
Adjustable Clamp Company..51a
Algoma Panel Company.....19a
American Chime Clock Co....53a
American Crayon Company...56a
American Lead Pencil Co....21a
American Saw Mill Machy. Co.10a
American Technical Society..49a
American Type Founders Co. .....3rd Cover
American Walnut Mfrs. Ass'n.19a
Balsa Wood Company, Inc..42a
Beckwith Machine Company.12a
Bemis, A. L.....52a
Berger Brothers Co.....15a
Bingler Sons, Inc., Chas. F.51a
Binney & Smith Co.....22a
Blount Co., J. G.....4th Cover
Brackett Machinery Co.....16a
Bruce Publishing Co.12a, 53a & 54a
Carter Company, R. L.....17a
Century Company, The.....49a
Challenge Machinery Co....40a
Chandler & Price Co., The...41a
Cincinnati Shaper Co., The...29a
Cincinnati Tool Company....10a
Clark Jr. Electric Co., Jas..36a
Classified Wants.....20a
Cleveland Quarries Company.10a
Cleveland Twist Drill Co ...28a
Columbian Vise & Mfg. Co., The.....32a
Consolidated Concrete Machinery Corp.....43a
Crescent Machine Co., The.. 8a
Dakalite Products Co., Inc..45a
Delta Manufacturing Co.....45a
Devoe & Raynolds Co.....23a
Dietzgen Co., Eugene.....39a
Disston & Sons, Henry..... 3a
Dixon Crucible Co., Jos.....39a
Dudley Lock Corporation....51a
Eastern Arts Association....49a
Foley Manufacturing Co..... 9a
Forged Steel Products Co....36a
Fremont Equipment Company.40a
Gallmeyer & Livingston Co.Insert
Graham & Co., Inc., John H.17a
Grand Rapids Fibre Cord Co.44a
Hall, W. A.....18a
Hall & Brown Wdwkg. Mach. Co.....6a
Hartford Clamp Company....52a
Heston & Anderson.....12a
Higgins & Co., Chas. M....23a
Huther Bros. Saw Mfg. Co... 6a
Indiana Quartered Oak Co...43a
International Textbook Co....46a
January & Wood Co., Inc...22a
Jennings Mfg. Co., Russell...52a
Johnson Machine Co., Carlyle 8a
Johnson & Son, S. C.....35a
Johnson Gas Appliance Co....15a
Koster Solder Company.....14a
Kewaunee Mfg. Company.....39a
Klise Manufacturing Co.....43a
Lufkin Rule Co., The.....20a
Lumber Dealers Directory....15a
Lux Machine Company.....16a
McGraw-Hill Book Co., Inc.23a
Maydole Hammer Co., David.31a
Mid West Lumber Company. 6a
Morgan Vise Company.....52a
Morse Twist Drill & Machine Co.....32a
Mummert-Dixon Co.....14a
Niagara Machine & Tool Wks.14a
North Bros. Mfg. Company..34a
Oliver Machinery Co....2nd Cover
Paasche Airbrush Company...45a
Parks Woodworking Machine Co., The.....53a
Paxton Lumber Co., Frank...18a
Pease Company, The C. F...11a
Peck, Stow & Wilcox Co....15a
Plumb, Inc., Fayette R.....33a
Porter-Cable Machine Co.....12a
Post Company, Frederick....22a
Reid-Way Company.....53a
Richards-Wilcox Mfg. Co.... 2a
Rockford Drilling Machine Co.52a
Rockford Machine Tool Co... 1a
Russell Electric Company....17a
School-Arts Magazine, The...47a
School Shop Shopping Guide.50a
Scott-Bansbach Machy. Co. 16a
Sebastian Lathe Company...30a
Seneca Falls Machine Co....30a
Sheldon & Company, E. H...37a
Simonds Saw & Steel Co.... 8a
South Bend Lathe Works...24a
Stanley Rule & Level Plant.27a
Starrett Company, L. S.....32a
Teachers Agencies.....52a
Templeton, Kenly & Co., Ltd.36a
Thurston Manual Training Supply Co.....48a
Toles Company, W. C.....13a
U. S. Blue Company.....22a
Wallace & Company, J. D.... 7a
Western States Envelope Co..40a
Wiley & Sons, Inc., John...38a
Yates-American Machine Co. .....4a & 5a



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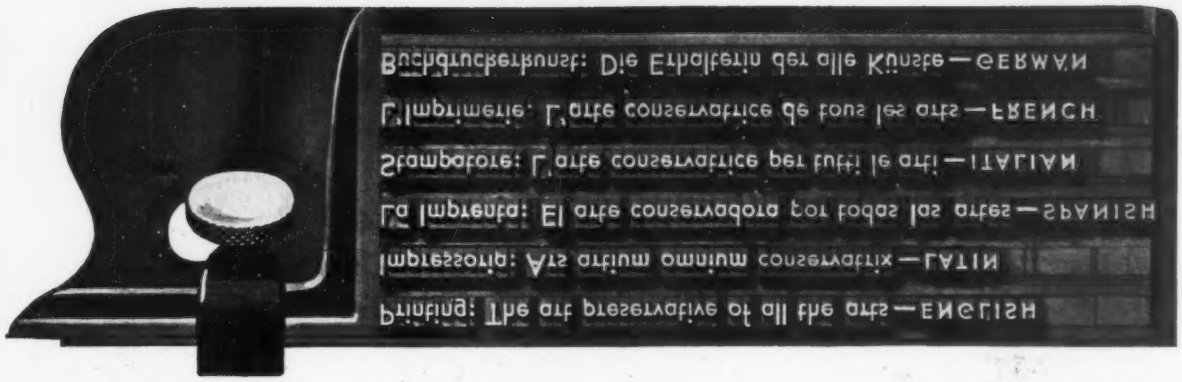
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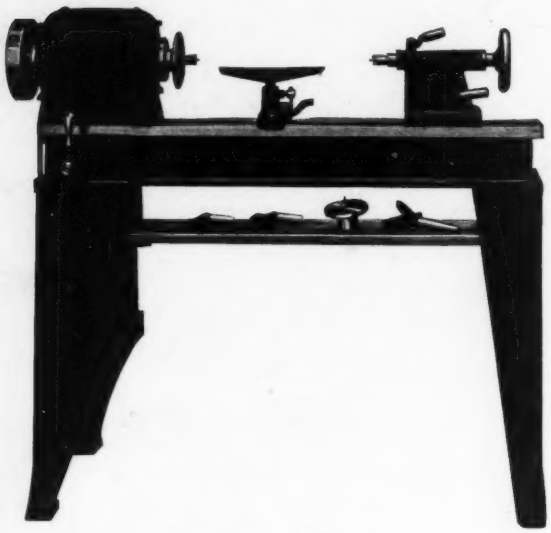

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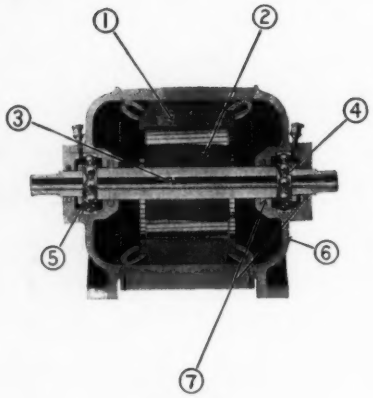

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